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**THE NASA DIGITAL VGH PROGRAM -  
EXPLORATION OF METHODS AND FINAL RESULTS**

**Volume II - L 1011 Data 1978-1979: 1619 HOURS**

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## FOREWORD

This report was prepared by Eagle Engineering, Inc., Hampton Division, under contract NASW 4430, sponsored by NASA Langley Research Center and the Federal Aviation Administration Technical Center under the FAA-NASA Interagency Agreement No. DTFA03-890-A-00019 of 13 June 1989. This report fulfills the requirement of the Program Plan for the National Aging Aircraft Research Program, DOT/FAA/CT-88/32, August 1989, Paragraph 2.3.2.1, Flight Loads.

The Eagle Engineering, Inc. effort was performed by Norman L. Crabill and administered under the direction of Joseph W. Stickle (NASA Langley Research Center) and Thomas DeFiore (FAA Technical Center).







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Volume II: L 1011 Data 1978-1979: 1619 Hours  
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SUMMARY

Data obtained from the Digital Flight Data Recorder system of a L 1011 aircraft in 914 flights and 1619 hours of airline revenue operations are presented as an extension of the work documented in Volume I of this report. Data on conditions with flap deployment and autopilot use are given. In addition, acceleration statistics are presented from 23 hours on nonrevenue flights.

INTRODUCTION

This document presents the results of the NASA DVGH Program obtained during 1978-1979 operations of a Lockheed L 1011 aircraft. This volume is an extension of the work and methods documented in Volume I. The data reduction analysis and methods, and data presentation are essentially the same as those reported in Volume I. However, this report does contain additional data on autopilot usage and some limited acceleration-derived exceedance data obtained from non-revenue flights.



## AIRCRAFT AND INSTRUMENTATION

### Aircraft

The aircraft was a Lockheed L 1011 as in Volume I. Aircraft characteristics used in the analysis are given in Table I; the configuration is shown in figure 1 with the location of the accelerometers as indicated.

### Instrumentation

The data were obtained from the Digital Flight Data Recorder system described in Volume I. Measurements were:

<u>Parameter</u>	<u>Range and Units</u>	<u>Samples per Second</u>
$a_n + 1$	-3g to +6g	4
$a_y$	-1g to +1g	4
CAS	100 to 450 kts	1
HP	-1,000' to 50,000 ft	1
FLP	-5° to 60°	1
Autopilot Status	Off or On	Discrete

Note that Spoiler data are not reported here, although they were in Volume I.

### SCOPE OF DATA

Data were collected from a single aircraft operating in regular airline service over the service area shown in figure 2 during 1978 and 1979. Almost all of the data (914 flights and 1619 hours) were obtained during passenger-carrying revenue service; a

small amount (56 flights and 23 hours) was obtained during non-revenue service (ferry flights mainly, although some training and maintenance flights may have been included). As in Volume I, some gaps in the data exist due to faulty or missing records, etc., but this is believed to be small (less than 10 percent of the number of flights).

#### DATA REDUCTION PROCESS

The Data Reduction Process is basically the same as described in Volume I. The filter used to separate maneuver and gust accelerations was the same since the data are for the same type of aircraft described in Volume 1. Although the results of reference 13 in Volume I indicate that the operation of the autopilot can cause up to a 20 percent reduction in the normal acceleration peak response to continuous turbulence, it was decided, after consultation with the industry, not to account for this in deriving  $U_{de}$ , in order to maintain comparability with the earlier VGH results, even though the autopilot status was being monitored in this investigation.

#### RESULTS

##### Flight Profile and Acceleration Derived Statistics

Presentation of Flight Profile Statistics results is similar to that described in Volume I. Flight Profile Statistics are given in Percent of Time, and as Maximum Values on a Percent of Flight basis for Entire Flights (flaps up or down) and for Flaps Deflected. For operations reported in this volume, the conditions

existing during flap retraction after lift off, and the conditions existing during flap deflection before landing are given.

Acceleration Derived Statistics are also presented as in Volume I, except that with Flaps Deflected, the maximum  $a_n$  and Equivalent Airspeeds during that part of the flight are presented for the various flap detents in take off and landing. Also new are level crossing counts for the Acceleration Derived Quantities for non-revenue ferry, training, and maintenance flights. All other results are for revenue flights. The Acceleration Derived quantities are subject to the same limitations discussed in Volume I, which indicates that the exceedances derived from the DFDR system at 4 samples per second may be significantly less than if actual peak values were counted.

The detailed Flight Profile and Acceleration Derived Statistics are given in figures 3 through 24 as shown in Table II. No discussion of the data is presented.

#### Autopilot Usage

Autopilot status was monitored as off, or on, without regard to the exact on-mode. The altitudes for autopilot turn-on during climb, turn-off during descent, and percent-of-time and percent-of-flights it was on are given in figure 25. The characteristics of a low amplitude oscillation in normal acceleration that appears sporadically in cruise, as first reported in Volume I, are summarized in figure 26. This phenomenon is believed to be due to off-nominal autopilot operation in the altitude-hold mode. The presence of such a low-frequency resonance was predicted in reference 13. Figure 27 shows normal acceleration power spectra

with autopilot off and on. It can be seen that the effect of the autopilot operation is to shift the gust response of aircraft to a higher frequency, that is from 0.35 Hz to 0.8 Hz in this example as predicted in reference 13. Reference 13 also indicates that another effect of the autopilot is a reduction in the gust response by 10 to 25 percent. However, these autopilot effects were not factored into the  $U_{de}$  transfer function in this analyses in order to maintain comparability with the previous VGH results.

#### CONCLUDING REMARKS

Data obtained from the Digital Flight Data Recorder system of an L 1011 aircraft in 914 flights and 1619 hours of airline revenue operations are presented as an extension of the work documented in Volume I of this report. Some new data on conditions with flap deployment and autopilot usage are given. In addition, acceleration statistics are presented from 23 hours on non-revenue flights. No general discussion of the data is presented.

TABLE I

## LOCKHEED L 1011-1 CHARACTERISTICS USED IN THE ANALYSIS

## O Geometrical Characteristics

- o Wing Area  $S = 3456 \text{ ft}^2$
- o Wing Mean Chord = 22.3 ft

O Lift Curve Slope  $C_{l_\alpha}$  per degree

Flaps up = f(M, HP)					Flaps Down = f(FLP)	
<u>M</u>	<u>HP = 0</u>	<u>10kft</u>	<u>20kft</u>	<u>40 kft</u>	<u>FLP, deg</u>	<u>HP = 0</u>
.20	.0923	.0928	.0929	.0936	0	.0925
.35	.0923	.0928	.0930	.0938	4	.0973
.50	.0913	.0920	.0929	.0946	10	.0980
.60	.0918	.0928	.0940	.0963	18	.0975
.70	.0940	.0954	.0970	.1003	22	.0971
.80	--	.1038	.1058	.1100	27	.0962
.89	--	.1210	.1240	.1305	33	.0948
.91	--	--	.1227	.1286	45	.0912
.95	--	--	.1030	.1081		

- o Weight was computed linearly with time from take off to landing as described in Appendix C in Volume I.

TABLE II  
INDEX OF FLIGHT PROFILE AND ACCELERATION STATISTICS

FLIGHT PROFILE STATISTICS

o ENTIRE FLIGHTS

Figure Number	Subject	Page Numbers
3	Weight vs. Flight Duration	12-17
4	Altitudes and Gross Weights	18
5	Altitudes and Airspeeds	19-22
6	Altitude Summary	23
7	Maximum Altitudes	24-25

o FLAPS DEFLECTED

8	Flap Detent Use	26
9	Weights, Altitudes and Airspeeds	27-33
10	Flap Deflection Times	34-36
11	Equivalent Airspeeds and Detents	37
12	Flap Use above 10,000 ft	38-39

TABLE II (continued)  
ACCELERATION DERIVED STATISTICS

o ENTIRE FLIGHTS

Figure Number	Subject	Page Numbers
13	Normal Acceleration Exceedances	
(a)	$a_n$ matrix	40
(b)	$a_{nM}$ matrix	41
(c)	$a_{nG}$ matrix	42
(d)-(k)	$a_n$ , $a_{nM}$ , $a_{nG}$ plots	43-52
14	Lateral Acceleration Exceedances	
(a)	$a_y$ matrix	53
(b)-(k)	$a_y$ plots	54-63
15	$U_{de}$ Exceedances	
(a)	$U_{de}$ matrix	64
(b)-(k)	$U_{de}$ plots	65-74
16	Peak Positive and Negative $a_n$ vs. Altitude	
(a)	$a_n$ matrix	75
(b)-(k)	$a_n$ plots	76-85
17	Peak Positive and Negative $a_{nM}$ vs. Altitude	
(a)	$a_{nM}$ matrix	86
(b)-(k)	$a_{nM}$ plots	87-96
18	Peak Positive and Negative $a_{nG}$ vs. Altitude	
(a)	$a_{nG}$ matrix	97
(b)-(k)	$a_{nG}$ plots	98-107

TABLE II (concluded)

19 Peak Positive and Negative  $U_{de}$  vs. Altitude

(a)	$U_{de}$ matrix	108
(b)-(k)	$U_{de}$ plots	109-118

o FLAPS DEFLECTED

Figure Number	Subject	Page Numbers
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20  $a_n$  Exceedances with Flaps Deflected

(a)	Take Off Detents matrix	119
(b)	Take Off Detents plot	120
(c)	Landing Detents matrix	121
(d)	Landing Detents plot	122

21 Peak Positive and Negative  $a_n$  per flight and EAS bands

(a)-(d)	Take Off Detents	123-126
(e)-(k)	Landing Detents	127-133

o NON-REVENUE FLIGHTS

Figure Number	Subject	Page Numbers
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22 Normal Acceleration Exceedances

(a)	$a_n$ matrix	134
(b)	$a_{nM}$ matrix	135
(c)	$a_{nG}$ matrix	136
(d)	$a_n, a_{nM}, a_{nG}$ plots	137-146

23 Lateral Acceleration Exceedances

(a)	$a_y$ matrix	147
(b)-(k)	$a_y$ plots	148-157

24  $U_{de}$  Exceedances

(a)	$U_{de}$ matrix	158
(b)-(k)	$U_{de}$ plots	159-168

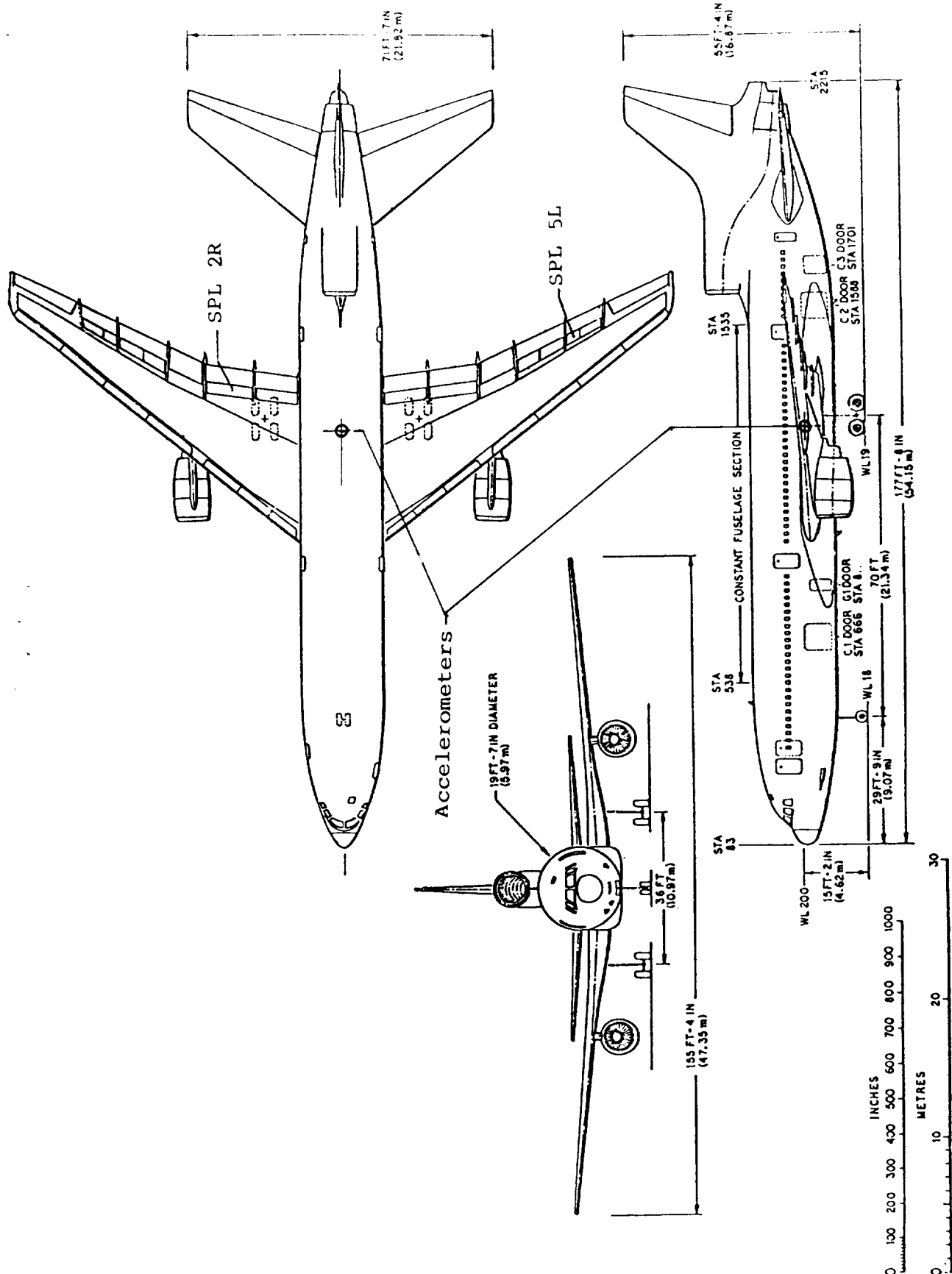
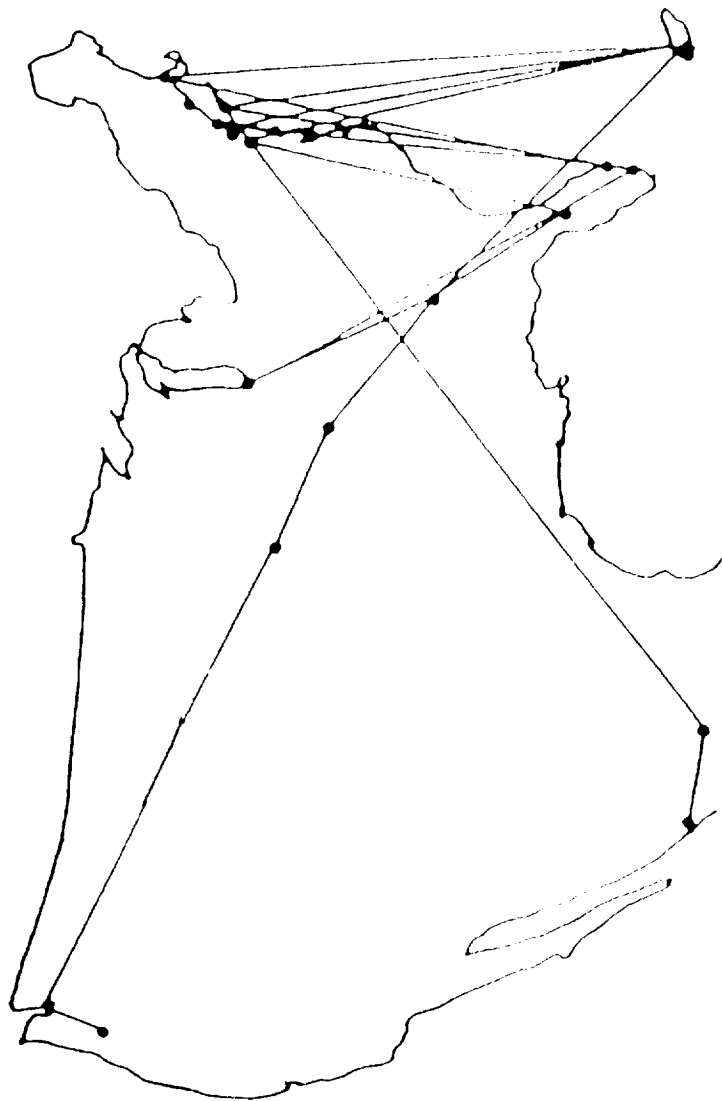


FIGURE 1.- Aircraft three-view with locations of accelerometers and spoilers.



MARCH 1978 - JULY 1979

914 FLIGHTS

1619 HOURS

700,000 N. MILES

FIGURE 2.- Location of service area and scope of data.

DURATION OF FLIGHT, HOURS	PERCENT OF FLIGHTS															
	250 TO 270 KLS	270 TO 290 KLS	290 TO 310 KLS	310 TO 330 KLS	330 TO 350 KLS	350 TO 370 KLS	370 TO 390 KLS	390 TO 410 KLS	410 TO 430 KLS	430 TO 450 KLS	450 TO 470 KLS	470 TO 490 KLS	490 TO 510 KLS	510 TO 530 KLS	530 TO 550 KLS	550 TO 570 KLS
6.5-7.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.0-6.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.5-6.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.0-5.5	0	0	0	0	0	0	0	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1
4.5-5.0	0	0	0	0	0	0	0.1	0.2	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4.0-4.5	0	0	0	0	0	0	0.7	1.3	1.3	1.6	1.6	1.6	1.6	1.6	1.6	1.6
3.5-4.0	0	0	0	0	0	0.1	1.5	3.8	3.8	3.0	2.6	2.6	2.6	2.6	2.6	2.6
3.0-3.5	0	0	0	0.1	0.8	0.8	1.9	6.2	4.9	0.5	0.5	0.5	0.5	0.5	0.5	0.5
2.5-3.0	0	0	0	1.3	3.9	3.9	6.2	4.9	2.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2.0-2.5	0	0	0.1	1.1	3.6	3.6	3.9	2.5	1.5	0	0	0	0	0	0	0
1.5-2.0	0	0	0.5	2.4	4.9	4.9	6.0	1.5	0	0	0	0	0	0	0	0
1.0-1.5	0	0	0.2	1.4	2.7	2.7	1.4	0	0	0	0	0	0	0	0	0
.8-1.0	0	0	0.5	1.9	1.2	1.2	0.7	0	0	0	0	0	0	0	0	0
.6-.8	0	0	1.4	2.2	2.2	2.2	0.9	0	0	0	0	0	0	0	0	0
.5-.6	0	0	1.6	2.6	1.4	1.4	0.5	0	0	0	0	0	0	0	0	0
.4-.5	0	0.3	1.9	2.5	1.5	1.5	0	0	0	0	0	0	0	0	0	0
.3-.4	0	0.2	0.5	0.7	0.1	0.1	0	0	0	0	0	0	0	0	0	0
.0-.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL PERCENTS, ALL FLIGHTS	0	0.9	6.9	16.2	22.5	24.1	18.5	9.3	1.6							

(a) Gross weight at take off

Figure 3.- Percent of flights: Weight vs duration.

DURATION OF FLIGHT, HOURS	PERCENT OF FLIGHTS													
	250 TO 270 KILBS	270 TO 290 KILBS	290 TO 310 KILBS	310 TO 330 KILBS	330 TO 350 KILBS	350 TO 370 KILBS	370 TO 390 KILBS	390 TO 410 KILBS	410 TO 430 KILBS	430 TO 450 KILBS	450 TO 470 KILBS	470 TO 490 KILBS	490 TO 510 KILBS	510 TO 530 KILBS
6.5-7.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.0-6.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.5-6.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.0-5.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4.5-5.0	0	0	0.1	0.1	0.3	0.2	0	0	0	0	0	0	0	0
4.0-4.5	0	0	0.5	1.1	1.1	0.4	0	0	0	0	0	0	0	0
3.5-4.0	0	0	0.4	2.2	2.2	1.5	0.1	0	0	0	0	0	0	0
3.0-3.5	0	0.1	0.5	4.2	4.2	3.6	0.4	0	0	0	0	0	0	0
2.5-3.0	0	0.1	1.4	2.4	2.4	4.5	0.5	0	0	0	0	0	0	0
2.0-2.5	0	1.0	3.3	6.2	6.2	5.7	0.8	0	0	0	0	0	0	0
1.5-2.0	0	0.7	1.5	4.3	4.3	4.3	0.7	0	0	0	0	0	0	0
1.0-1.5	0	0.4	2.7	4.9	4.9	6.1	1.2	0	0	0	0	0	0	0
.8-1.0	0	0.2	0.4	3.2	3.2	2.0	0	0	0	0	0	0	0	0
.6-.8	0	0.1	1.5	1.4	1.4	1.2	0	0	0	0	0	0	0	0
.5-.6	0	0.3	2.3	2.2	2.2	1.3	0.5	0	0	0	0	0	0	0
.4-.5	0	0.8	2.2	2.1	1.3	0.2	0	0	0	0	0	0	0	0
.3-.4	0	0.5	2.5	2.1	1.1	0	0	0	0	0	0	0	0	0
.0-.3	0	0.2	0.5	0.7	0.1	0	0	0	0	0	0	0	0	0
TOTAL PERCENTS, ALL FLIGHTS	0	4.6	20.2	37.3	33.4	4.5	0	0	0	0	0	0	0	0

(b) Gross weight at landing

Figure 3.- Continued.

DURATION OF FLIGHT, HOURS	PERCENT OF FLIGHTS														
	10 TO 30 KLS	30 TO 50 KLS	50 TO 70 KLS	70 TO 90 KLS	90 TO 110 KLS	110 TO 130 KLS	130 TO 150 KLS	150 TO 170 KLS	170 TO 190 KLS	190 TO 210 KLS	210 TO 230 KLS	230 TO 250 KLS	250 TO 270 KLS	270 TO 290 KLS	290 TO 310 KLS
6.5-7.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.0-6.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.5-6.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.0-5.5	0	0	0	0	0	0.1	0.1	0.1	0	0	0	0	0	0	0
4.5-5.0	0	0	0	0	0	0.3	0.3	0.3	0	0	0	0	0	0	0
4.0-4.5	0	0	0	0	0	1.8	0.3	0.1	0	0	0	0	0	0	0
3.5-4.0	0	0	0	1.2	3.0	2.3	0	0	0	0	0	0	0	0	0
3.0-3.5	0	0	0	6.6	2.3	1.1	0	0	0	0	0	0	0	0	0
2.5-3.0	0	0	1.1	6.8	1.1	0.4	0	0	0	0	0	0	0	0	0
2.0-2.5	0	0	13.0	3.5	0.3	0.3	0	0	0	0	0	0	0	0	0
1.5-2.0	0	0.1	8.8	2.2	0	0	0	0	0	0	0	0	0	0	0
1.0-1.5	0	4.6	9.8	1.0	0	0	0	0	0	0	0	0	0	0	0
.8-1.0	0	3.2	2.2	0.4	0	0	0	0	0	0	0	0	0	0	0
.6-.8	0	2.3	2.0	0	0	0	0	0	0	0	0	0	0	0	0
.5-.6	0	4.0	2.0	0.7	0	0	0	0	0	0	0	0	0	0	0
.4-.5	0	4.4	2.0	0.2	0	0	0	0	0	0	0	0	0	0	0
.3-.4	0.2	3.9	2.1	0	0	0	0	0	0	0	0	0	0	0	0
.0-.3	0.3	0.7	0.5	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL PERCENTS, ALL FLIGHTS	0.5	23.2	43.4	22.5	9.3	1.0	0	0	0	0	0	0	0	0	0

(c) Fuel weight at take off

Figure 3.- Continued.

DURATION OF FLIGHT, HOURS	PERCENT OF FLIGHTS													
	10 30 KLS	TO 50 KLS	30 TO 50 KLS	50 TO 70 KLS	70 TO 90 KLS	90 TO 110 KLS	110 TO 130 KLS	130 TO 150 KLS	150 TO 170 KLS	170 TO 190 KLS	170 TO 190 KLS	170 TO 190 KLS	170 TO 190 KLS	170 TO 190 KLS
6.5-7.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.0-6.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.5-6.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.0-5.5	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0
4.5-5.0	0.2	0.5	0	0	0	0	0	0	0	0	0	0	0	0
4.0-4.5	1.1	1.0	0	0	0	0	0	0	0	0	0	0	0	0
3.5-4.0	2.3	2.0	0	0	0	0	0	0	0	0	0	0	0	0
3.0-3.5	4.0	4.8	0	0	0	0	0	0	0	0	0	0	0	0
2.5-3.0	4.2	4.4	0.4	0	0	0	0	0	0	0	0	0	0	0
2.0-2.5	11.3	5.0	0.7	0	0	0	0	0	0	0	0	0	0	0
1.5-2.0	4.6	5.5	1.3	0	0	0	0	0	0	0	0	0	0	0
1.0-1.5	5.4	9.1	1.0	0	0	0	0	0	0	0	0	0	0	0
.8-1.0	1.4	3.8	0.5	0	0	0	0	0	0	0	0	0	0	0
.6-.8	1.1	2.5	0.7	0	0	0	0	0	0	0	0	0	0	0
.5-.6	1.6	3.6	0.9	0.5	0	0	0	0	0	0	0	0	0	0
.4-.5	1.0	4.4	1.0	0.2	0	0	0	0	0	0	0	0	0	0
.3-.4	1.1	3.7	1.4	0	0	0	0	0	0	0	0	0	0	0
.0-.3	0.3	0.7	0.5	0	0	0	0	0	0	0	0	0	0	0
TOTAL PERCENTS, ALL FLIGHTS	39.8	51.0	8.4	0.8	0	0	0	0	0	0	0	0	0	0

(d) Fuel weight at landing

Figure 3.- Continued.

DURATION OF FLIGHT, HOURS	PERCENT OF FLIGHTS													
	0 TO 20 KLS	20 TO 40 KLS	40 TO 60 KLS	60 TO 80 KLS	80 TO 100 KLS	100 TO 120 KLS	120 TO 140 KLS	140 TO 160 KLS	160 TO 180 KLS	180 TO 200 KLS	200 TO 220 KLS	220 TO 240 KLS	240 TO 260 KLS	260 TO 280 KLS
6.5-7.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.0-6.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.5-6.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.0-5.5	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0
4.5-5.0	0	0	0	0	0.5	0.2	0	0	0	0	0	0	0	0
4.0-4.5	0	0	0	0	2.0	0.1	0	0	0	0	0	0	0	0
3.5-4.0	0	0	0	0.8	3.5	0	0	0	0	0	0	0	0	0
3.0-3.5	0	0	7.9	1.0	0	0	0	0	0	0	0	0	0	0
2.5-3.0	0	0.7	8.3	0	0	0	0	0	0	0	0	0	0	0
2.0-2.5	0	13.7	3.3	0	0	0	0	0	0	0	0	0	0	0
1.5-2.0	0	11.3	0.1	0	0	0	0	0	0	0	0	0	0	0
1.0-1.5	5.9	9.5	0	0	0	0	0	0	0	0	0	0	0	0
.8-1.0	5.7	0.1	0	0	0	0	0	0	0	0	0	0	0	0
.6-.8	4.3	0	0	0	0	0	0	0	0	0	0	0	0	0
.5-.6	6.7	0	0	0	0	0	0	0	0	0	0	0	0	0
.4-.5	6.6	0	0	0	0	0	0	0	0	0	0	0	0	0
.3-.4	6.2	0	0	0	0.4	0	0	0	0	0	0	0	0	0
.0-.3	1.5	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL PERCENTS, ALL FLIGHTS	36.9	35.2	20.4	7.0	0.5	0	0	0	0	0	0	0	0	0

(e) Fuel burn vs flight duration

Figure 3.- Continued.

DURATION OF FLIGHT, HOURS	PERCENT OF FLIGHTS															
	0 TO 20 KLS	20 TO 40 KLS	40 TO 60 KLS	60 TO 80 KLS	80 TO 100 KLS	100 TO 120 KLS	120 TO 140 KLS	140 TO 160 KLS	160 TO 180 KLS	180 TO 200 KLS	200 TO 220 KLS	220 TO 240 KLS	240 TO 260 KLS	260 TO 280 KLS	280 TO 300 KLS	300 TO 320 KLS
6.5-7.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6.0-6.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.5-6.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.0-5.5	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4.5-5.0	0.1	0.3	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0
4.0-4.5	0.2	0.8	1.0	0.1	0	0	0	0	0	0	0	0	0	0	0	0
3.5-4.0	0	0.9	2.3	1.1	0	0	0	0	0	0	0	0	0	0	0	0
3.0-3.5	0.1	2.4	4.0	2.3	0	0	0	0	0	0	0	0	0	0	0	0
2.5-3.0	0.1	2.4	3.9	2.5	0	0	0	0	0	0	0	0	0	0	0	0
2.0-2.5	1.8	5.0	6.7	3.5	0	0	0	0	0	0	0	0	0	0	0	0
1.5-2.0	1.1	3.7	4.9	1.6	0	0	0	0	0	0	0	0	0	0	0	0
1.0-1.5	1.4	4.6	5.4	4.0	0	0	0	0	0	0	0	0	0	0	0	0
.8-1.0	0.4	2.0	3.2	0.2	0	0	0	0	0	0	0	0	0	0	0	0
.6-.8	1.3	1.5	1.1	0.3	0	0	0	0	0	0	0	0	0	0	0	0
.5-.6	2.8	1.8	1.8	0.3	0	0	0	0	0	0	0	0	0	0	0	0
.4-.5	2.6	2.6	1.2	0.1	0	0	0	0	0	0	0	0	0	0	0	0
.3-.4	2.8	2.5	0.8	0.1	0	0	0	0	0	0	0	0	0	0	0	0
.0-.3	1.1	0.2	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL PERCENTS, ALL FLIGHTS	16.0	31.0	36.8	16.3	0	0	0	0	0	0	0	0	0	0	0	0

(f) Payload weight vs flight duration.

Figure 3.- Concluded.

# PRESSURE ALTITUDE BANDS

GROSS WEIGHT KLSB	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
***CLIMB***										
250-270	0	0	0	0	0	0	0	0	0	0
270-290	0.0163	0.0097	0.0056	0.0026	0.0006	0	0	0	0	0.0347
290-310	0.1037	0.1176	0.1110	0.0812	0.0547	0.0447	0.0499	0.0413	0.0099	0.6140
310-330	0.2683	0.3059	0.3629	0.3093	0.2991	0.3770	0.4765	0.2901	0.0069	2.6961
330-350	0.4056	0.4321	0.5335	0.4886	0.5379	0.6953	0.8288	0.4155	0	4.3373
350-370	0.4645	0.5076	0.6480	0.6441	0.8088	1.1113	1.4090	0.6716	0	6.2650
370-390	0.3895	0.4014	0.4882	0.4780	0.6133	0.8607	1.0575	0.2857	0	4.5743
390-410	0.2076	0.1971	0.2363	0.2370	0.2925	0.3668	0.3950	0.0342	0	1.9664
410-430	0.0381	0.0371	0.0441	0.0320	0.0367	0.0279	0.0157	0	0	0.2316
PERCENT TOTAL TIME = 1.8937										
AVE GROSS WEIGHT IN ALTITUDE BAND										
	355.78	354.74	355.71	357.25	360.05	360.54	359.83	351.19	308.23	
***LEVEL***										
250-270	0	0	0	0	0	0	0	0	0	0
270-290	0.0493	0.1229	0.0305	0.0081	0.0110	0.0069	0.0050	0.0692	0.0110	0.3141
290-310	0.2012	0.2475	0.2592	0.0722	0.1831	0.1105	0.0804	1.7220	0.1396	3.0158
310-330	0.3938	0.3934	0.6388	0.2421	0.1971	0.3003	0.6058	7.5552	0.0244	10.3509
330-350	0.3632	0.4346	0.4546	0.2157	0.2765	0.4818	2.1031	14.8063	0	19.1359
350-370	0.0659	0.0807	0.1402	0.0763	0.1035	0.4437	3.7598	14.1293	0	18.7994
370-390	0	0.0201	0.0022	0	0.0045	0.1727	3.0682	4.5582	0	7.8258
390-410	0.0016	0.0055	0.0014	0	0.0011	0	0.7742	0.5306	0	1.3145
410-430	0	0.0012	0	0	0	0	0.0797	0	0	0.0810
PERCENT TOTAL TIME = 1.0751										
AVE GROSS WEIGHT IN ALTITUDE BAND										
	323.75	322.92	325.60	329.11	327.62	343.26	362.44	346.29	301.53	
***DESCENT***										
250-270	0	0	0	0	0	0	0	0	0	0
270-290	0.2089	0.1166	0.0487	0.0294	0.0250	0.0218	0.0269	0.0153	0.0019	0.4945
290-310	0.8501	0.6147	0.4338	0.2600	0.2120	0.2045	0.1718	0.1069	0.0007	2.8546
310-330	1.6165	1.1890	0.9742	0.6359	0.5453	0.5677	0.5078	0.2760	0	6.3125
330-350	1.5097	1.2241	1.0400	0.7301	0.6966	0.7383	0.7115	0.2451	0	6.8953
350-370	0.2186	0.2113	0.2584	0.2216	0.2430	0.2725	0.3072	0.0856	0	1.8212
370-390	0	0.0023	0.0025	0.0019	0.0019	0.0115	0.0257	0.0186	0	0.0644
390-410	0	0	0	0	0	0	0	0.0009	0	0.0009
410-430	0	0	0	0	0	0	0	0	0	0
PERCENT TOTAL TIME = 4.4038										
AVE GROSS WEIGHT IN ALTITUDE BAND										
	323.08	324.80	327.49	329.16	330.75	331.83	333.45	329.03	285.62	
										TOTAL FLIGHTS
										TOTAL TIME
										TOTAL AIRMILES
										914
										1619.24
										708383.64
</										



PRESSURE ALTITUDE BANDS										
CAS BAND KTS	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
120-130	0.0001	0	0	0	0	0	0	0	0	0.0001
130-140	0.0011	0.0002	0	0	0	0	0	0	0	0.0013
140-150	0.0105	0.0017	0	0	0	0	0	0	0	0.0122
150-160	0.0741	0.0032	0.0010	0	0	0	0	0	0	0.0784
160-170	0.1836	0.0230	0.0007	0	0	0	0	0	0	0.2073
170-180	0.1564	0.0439	0.0078	0	0	0	0	0	0	0.2080
180-190	0.1307	0.0395	0.0053	0	0	0	0	0	0	0.1755
190-200	0.0516	0.0169	0.0036	0	0	0	0	0	0	0.0721
200-210	0.0539	0.0939	0.0242	0.0002	0	0	0	0	0	0.1722
210-220	0.0700	0.1691	0.1152	0.0010	0	0	0	0	0	0.3554
220-230	0.0541	0.0752	0.0817	0.0011	0.0067	0	0.0040	0	0	0.2229
230-240	0.0510	0.0645	0.0689	0.0025	0.0583	0.0135	0.0026	0.0165	0	0.2779
240-250	0.0641	0.2159	0.1361	0.0125	0.0126	0.0103	0.0039	0.0502	0.0062	0.5119
250-260	0.0792	0.2874	0.1978	0.0138	0.0253	0.0096	0.0014	0.2037	0.1684	0.9867
260-270	0.0234	0.1047	0.1048	0.0049	0.0092	0.0056	0.0034	3.1522	0.0004	3.4087
270-280	0.0113	0.0293	0.0768	0.0037	0.0138	0.0045	0.0168	15.0436	0	15.1998
280-290	0.0092	0.0210	0.0753	0.0062	0.0061	0.0063	0.0482	12.2956	0	12.4680
290-300	0.0085	0.0253	0.0770	0.0127	0.0093	0.0144	0.8929	12.6007	0	13.6407
300-310	0.0071	0.0201	0.0879	0.0122	0.0170	0.0310	6.6572	0.0041	0	6.8366
310-320	0.0057	0.0145	0.0960	0.0147	0.0303	0.0820	2.2265	0	0	2.4698
320-330	0.0113	0.0102	0.0918	0.0355	0.0547	0.4939	0.6232	0	0	1.3207
330-340	0.0114	0.0137	0.0789	0.0821	0.1047	0.5902	0.0002	0	0	0.8812
340-350	0.0064	0.0139	0.0816	0.1437	0.1626	0.1791	0	0	0	0.5872
350-360	0	0.0163	0.0666	0.1881	0.1817	0.0698	0	0	0	0.5226
360-370	0	0.0024	0.0446	0.0778	0.0827	0.0057	0	0	0	0.2131
370-380	0	0	0.0033	0.0017	0.0020	0	0	0	0	0.0070
380-390	0	0	0	0	0	0	0	0	0	0
390-400	0	0	0	0	0	0	0	0	0	0
AV CAS	204.1130	242.0146	279.7108	338.9914	327.6451	329.2281	307.2635	282.7732	254.6688	
TOTAL HRS IN ALT. & LEVEL	17.4081	21.1458	24.7247	9.9497	12.5792	24.5475	169.6369	702.2781	2.8350	985.1050
PERCENT TIME IN ALT. & LEVEL	1.0751	1.3059	1.5269	0.6145	0.7769	1.5160	10.4763	43.3707	0.1751	60.8373
								TOTAL FLIGHTS		914
								TOTAL HOURS		1619.2

(b) Level

Figure 5.- Continued.





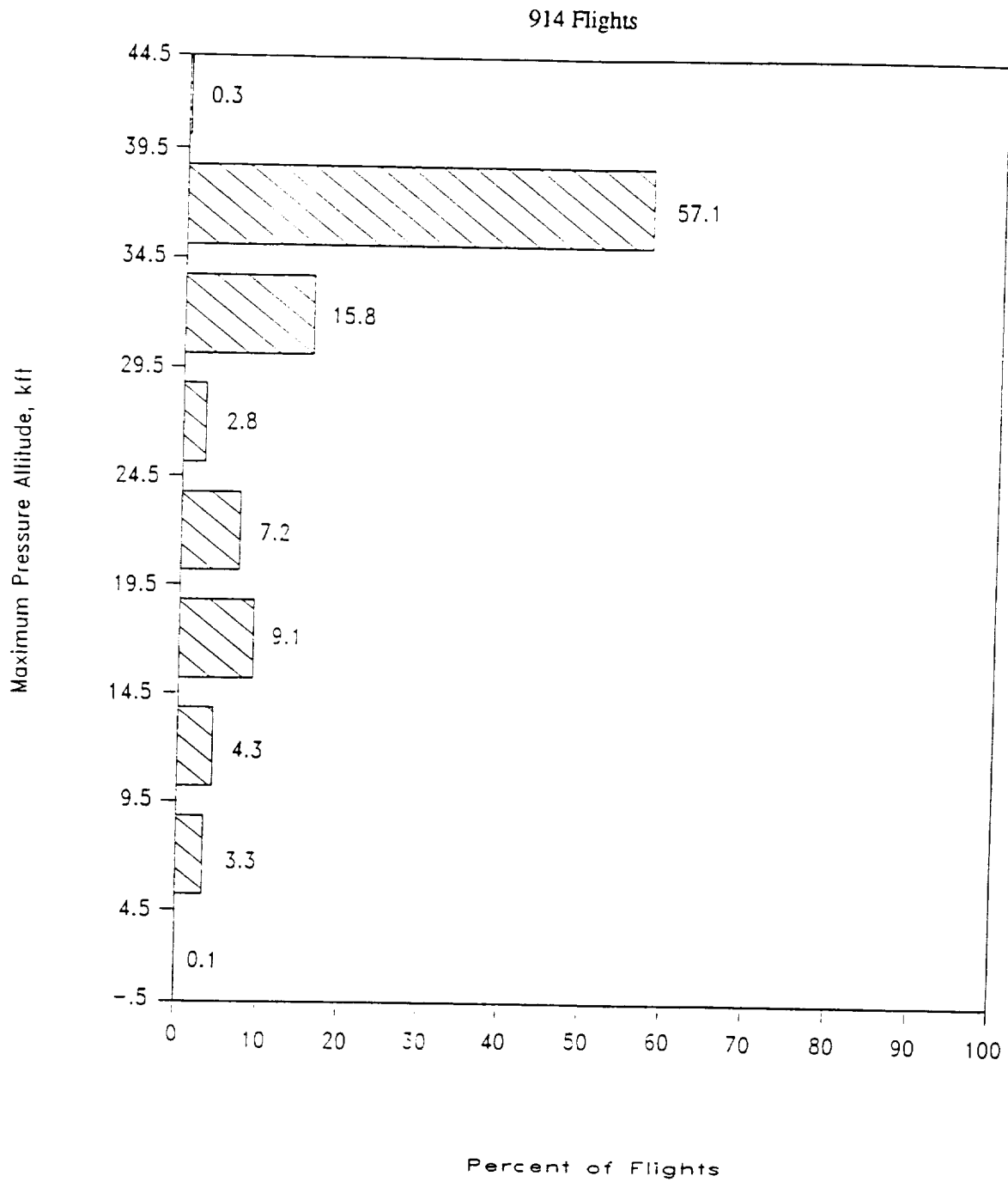
PRESSURE ALTITUDE BANDS									
TIME INTERVAL HOURS	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT
IN ALT. BAND									
6.50-7.00	0	0	0	0	0	0	0	0	0
6.00-6.50	0	0	0	0	0	0	0	0	0
5.50-6.00	0	0	0	0	0	0	0	0	0
5.00-5.50	0	0	0	0	0	0	0	0	0
4.50-5.00	0	0	0	0	0	0	0	0	0
4.00-4.50	0	0	0	0	0	0	0	0.219	0
3.50-4.00	0	0	0	0	0	0	0	0.547	0
3.00-3.50	0	0	0	0	0	0.109	1.641	0	0
2.50-3.00	0	0	0	0	0	0.766	4.048	0	0
2.00-2.50	0	0	0	0	0.109	2.626	8.425	0	0
1.50-2.00	0	0	0	0	0.109	0.985	7.768	0	0
1.00-1.50	0	0.109	0	0	0.547	2.845	15.755	0.219	0
.90-1.00	0	0	0	0	0	1.313	0.985	0	0
.80-.90	0	0.109	0	0.109	0.219	1.532	1.969	0	0
.70-.80	0	0.109	0	0.109	0	0.985	1.641	0	0
.60-.70	0	0	0.109	0	0	0.875	2.626	0	0
.50-.60	0.109	0	0	0	0.219	0.985	2.298	0.109	0
.45-.50	0	0	0	0	0.547	0.656	2.626	0	0
.40-.45	0.109	0	0.328	0.109	0.656	1.204	1.094	0	0
.35-.40	0.219	0.109	0	0	0.109	1.422	1.313	0	0
.30-.35	0.547	0.438	0.328	0	0.438	2.516	0.656	0	0
.25-.30	1.532	0.875	0.766	0.766	0.985	2.298	0.328	0	0
.20-.25	4.267	4.376	3.173	1.422	4.267	6.236	0.985	0	0
.15-.20	16.849	10.832	19.365	3.173	12.582	21.444	1.422	0	0
.10-.15	53.282	36.433	37.856	14.770	47.593	23.523	0.766	0	0
.05-.10	21.991	46.171	34.354	71.444	7.659	0.875	0.219	0	0
.00-.05	1.094	0.219	0.328	0.766	0	0	0.109	0	0
TOTAL HOURS IN ALT BAND	119.3799	108.0403	108.7194	77.1728	83.2978	110.4190	266.5208	742.5439	3.1508
TOTAL PERCENT TIME IN ALT BAND	7.3726	6.6723	6.7142	4.7660	5.1442	6.8192	16.4596	45.8574	0.1946
							TOTAL FLIGHTS		914
							TOTAL HOURS		1619.2

Figure 6.- Percent of flights that spend indicated time in pressure altitude bands.

DURATION OF FLIGHT, HOURS	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT
6.5-7.0	0	0	0	0	0	0	0	0	0
6.0-6.5	0	0	0	0	0	0	0	0	0
5.5-6.0	0	0	0	0	0	0	0	0	0
5.0-5.5	0	0	0	0	0	0	0.2	0	0
4.5-5.0	0	0	0	0	0	0	0.8	0	0
4.0-4.5	0	0	0	0	0	0	2.0	0	0
3.5-4.0	0	0	0	0	0	0	3.8	0	0
3.0-3.5	0	0	0	0	0	0	7.9	0	0
2.5-3.0	0	0	0	0	0.1	0.1	6.5	0	0
2.0-2.5	0	0	0	0.1	0	0.1	15.2	0.2	0
1.5-2.0	0	0	0	0	0.3	2.1	8.9	0.1	0
1.0-1.5	0	0.1	0	0	0.9	4.0	10.4	0	0
.8-1.0	0	0	0	0.1	0	0.7	1.4	0	0
.6-.8	0	0	0.1	1.5	1.3	0.5	0.1	0	0
.5-.6	0	0	0.1	1.2	5.0	0.2	0	0	0
.4-.5	0	0.7	1.3	3.7	0.9	0	0	0	0
.3-.4	0	1.5	2.3	2.4 <sup>b</sup>	0	0	0	0	0
.0-.3	0.1	1.0	0.4	0	0	0	0	0	0
TOTAL PERCENT ALL FLIGHTS	0.1	3.3	4.3	9.1	7.2	2.8	15.8	57.1	0.3

(a) Maximum altitude vs flight duration - matrix

Figure 7.- Percent of flights to maximum pressure altitude.



(b) Percent of flights to maximum pressure altitude per flight : plot

Figure 7.- Concluded.

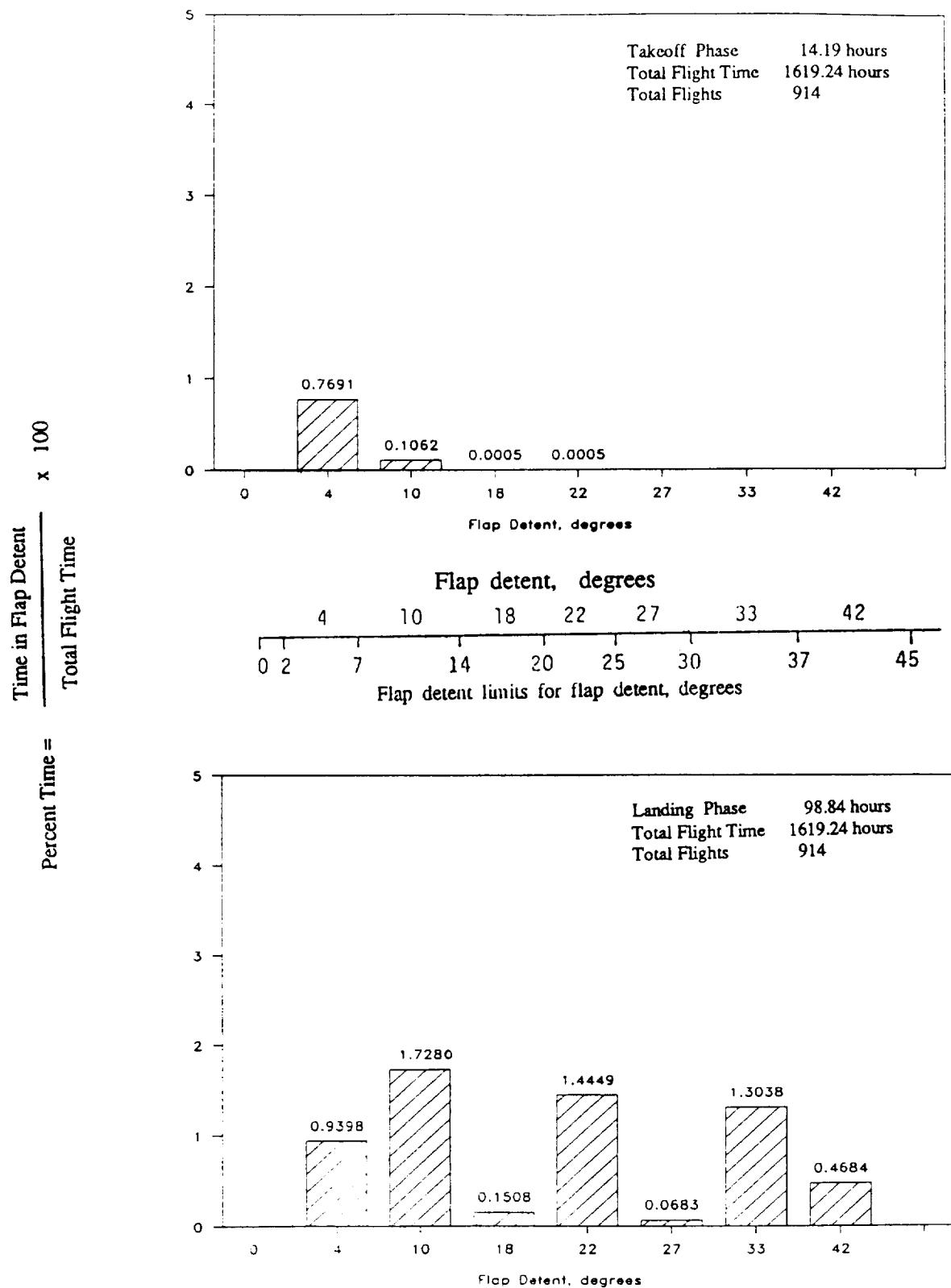
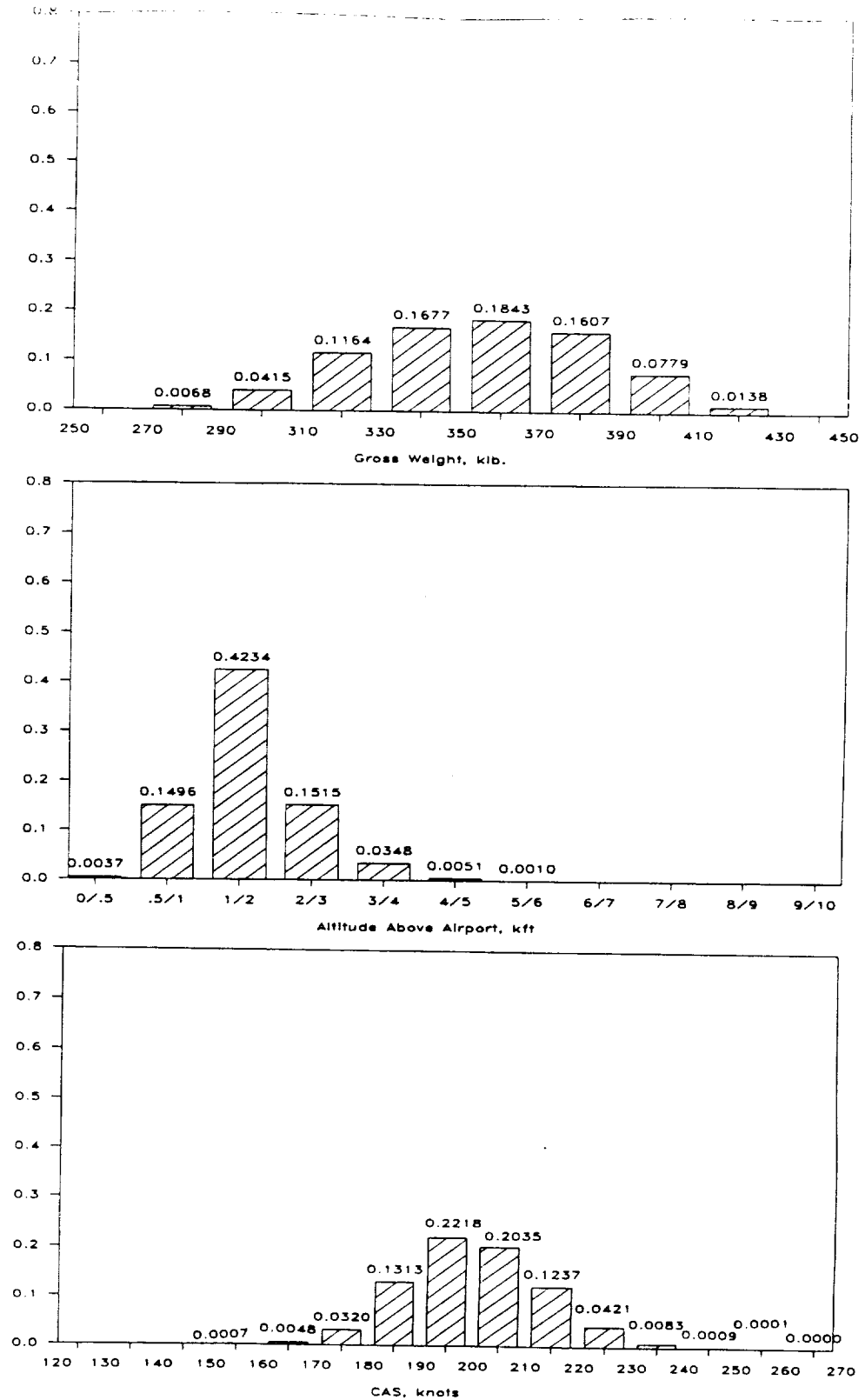


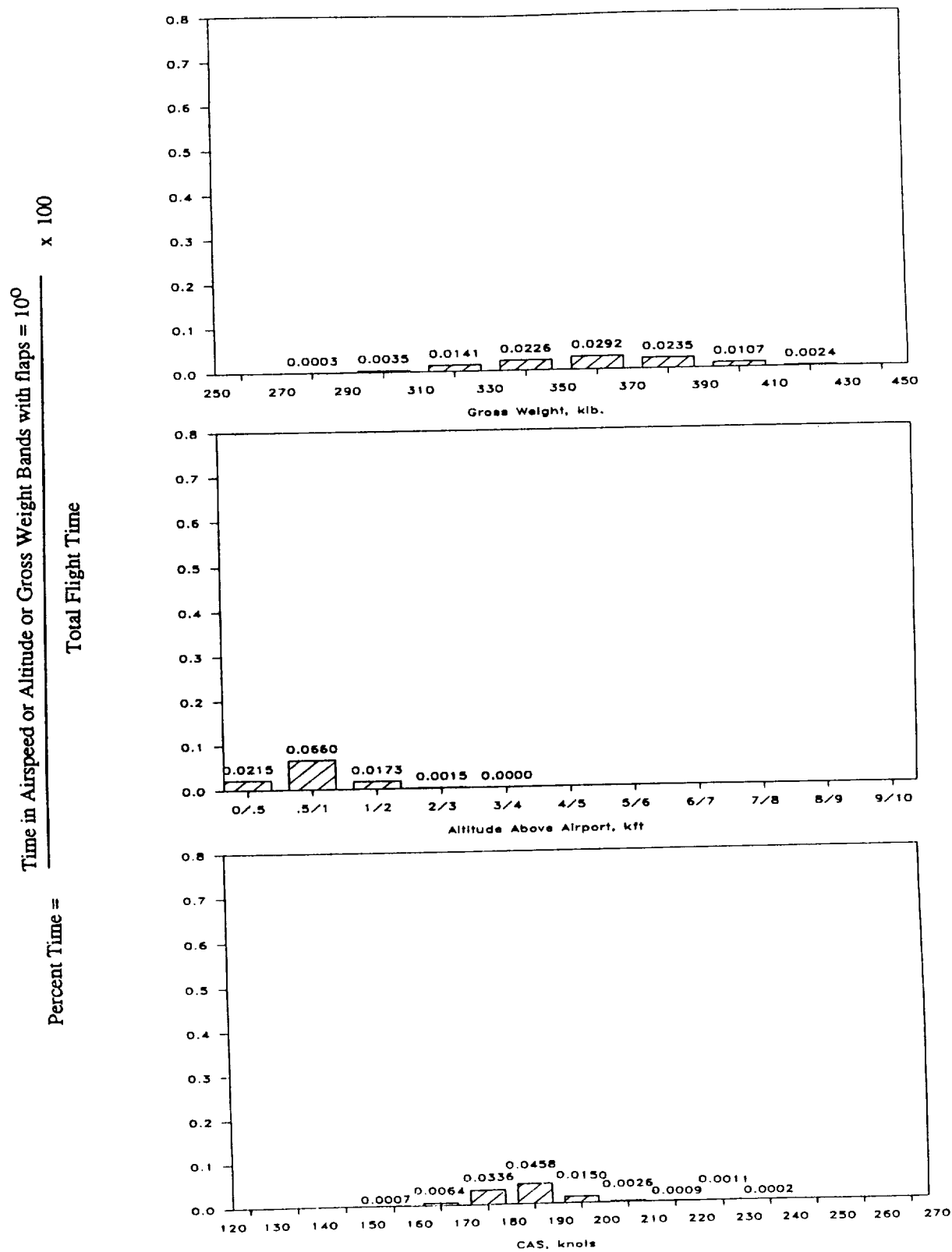
Figure 8.- Percent of total flight time at each flap detent.

Time in Airspeed or Altitude or Gross Weight Bands with flaps =  $4^0$   
 Percent Time =  $\frac{\text{Total Flight Time}}{\text{Time in Airspeed or Altitude or Gross Weight Bands with flaps = } 4^0} \times 100$



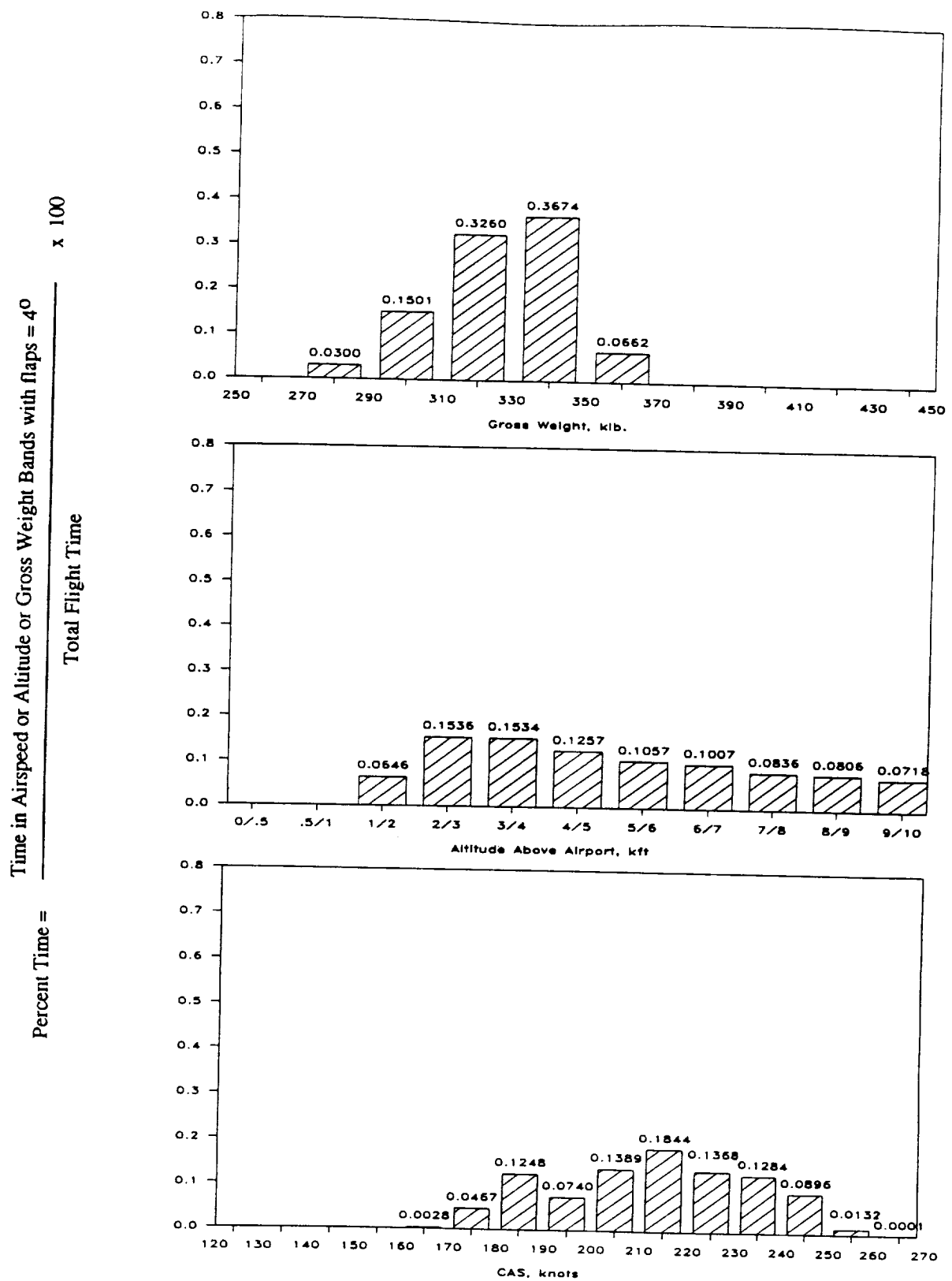
(a) Take off, flaps =  $4^0$ ; 12.4544 hours

Figure 9.- Gross weight, altitude above airport, and airspeed percent time distributions.



(b) Take off, flaps =  $10^0$ ; 1.7203 hours

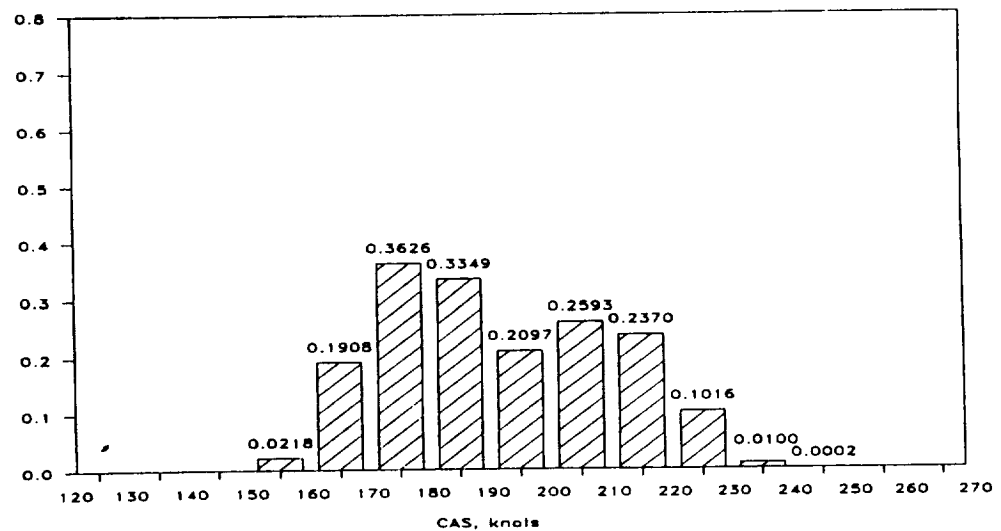
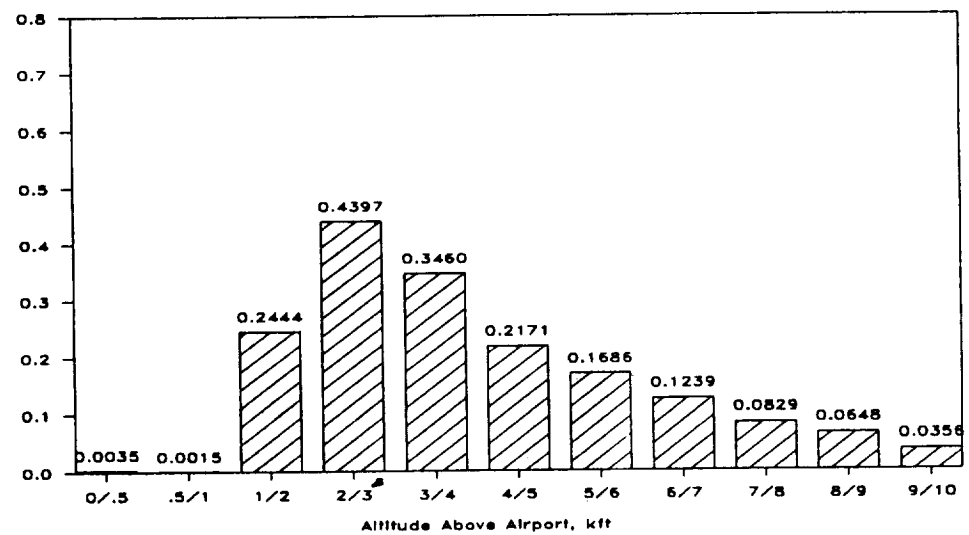
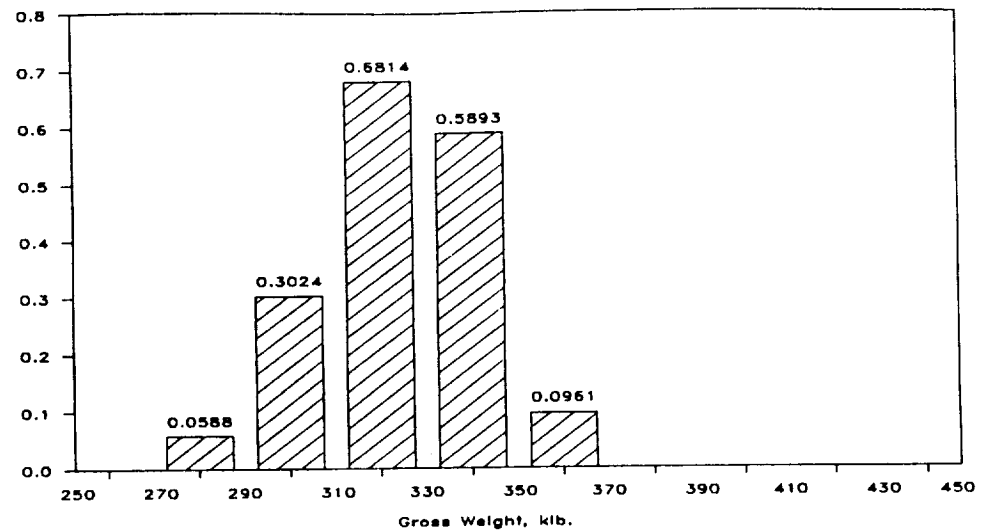
Figure 9. - Continued.



(c) Landing, flaps = 40; 15.2172 hours

Figure 9. - Continued.

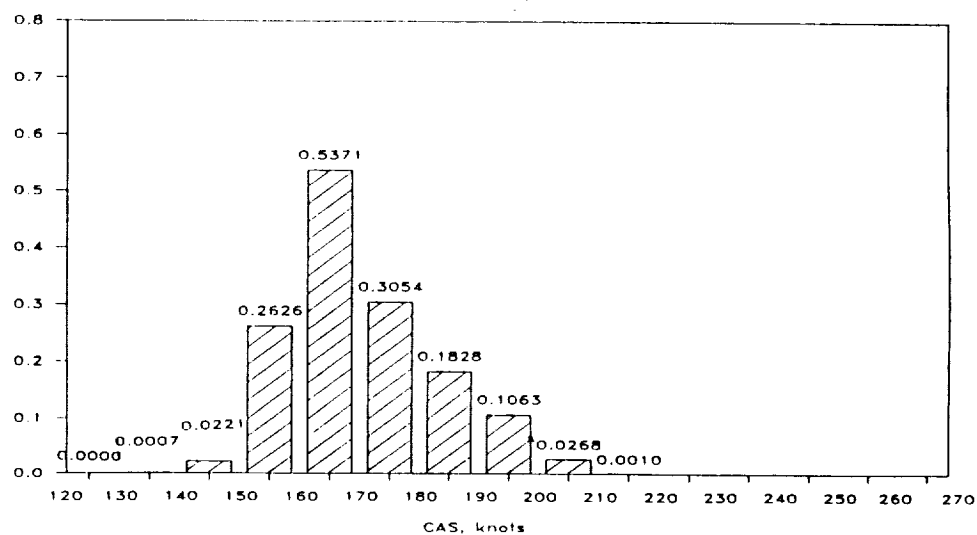
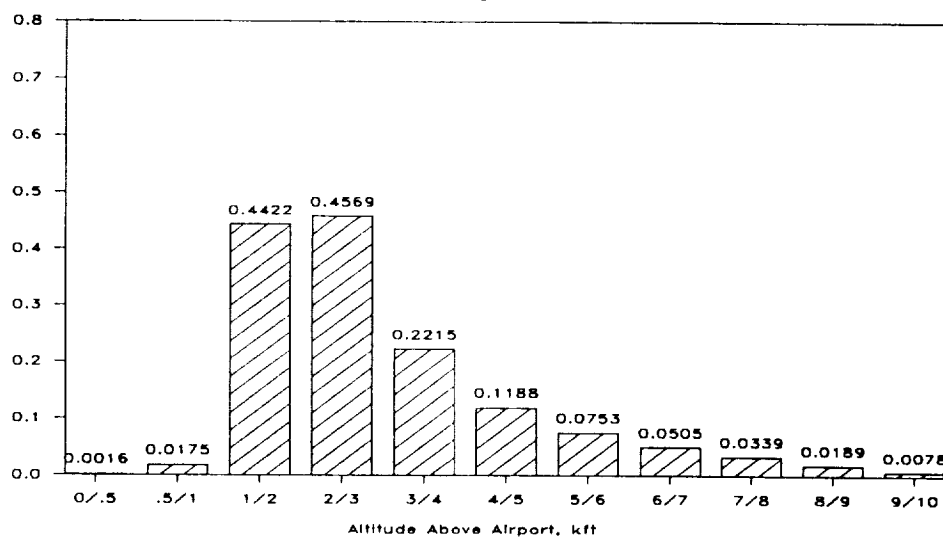
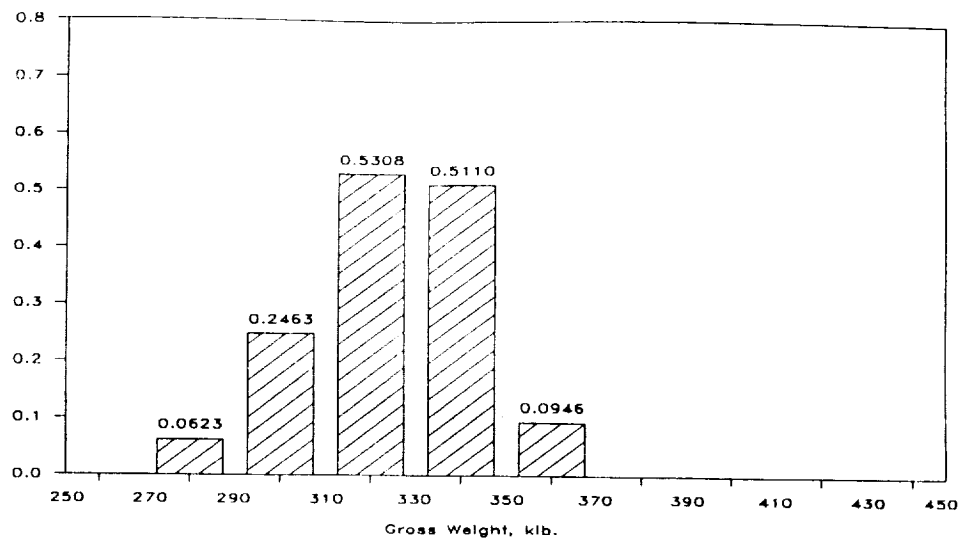
Percent Time =  $\frac{\text{Time in Airspeed or Altitude or Gross Weight Bands with flaps} = 10^0}{\text{Total Flight Time}} \times 100$



(d) Landing, flaps =  $10^0$ ; 27.9800 hours

Figure 9. - Continued.

$$\text{Percent Time} = \frac{\text{Time in Airspeed or Altitude or Gross Weight Bands with flaps} = 22^0}{\text{Total Flight Time}} \times 100$$



(e) Landing, flaps = 22°; 23.3960 hours

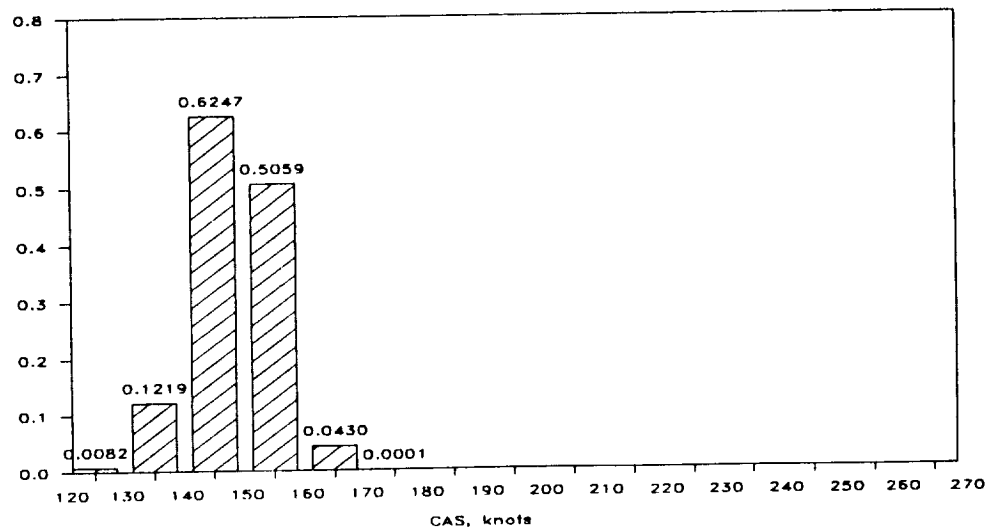
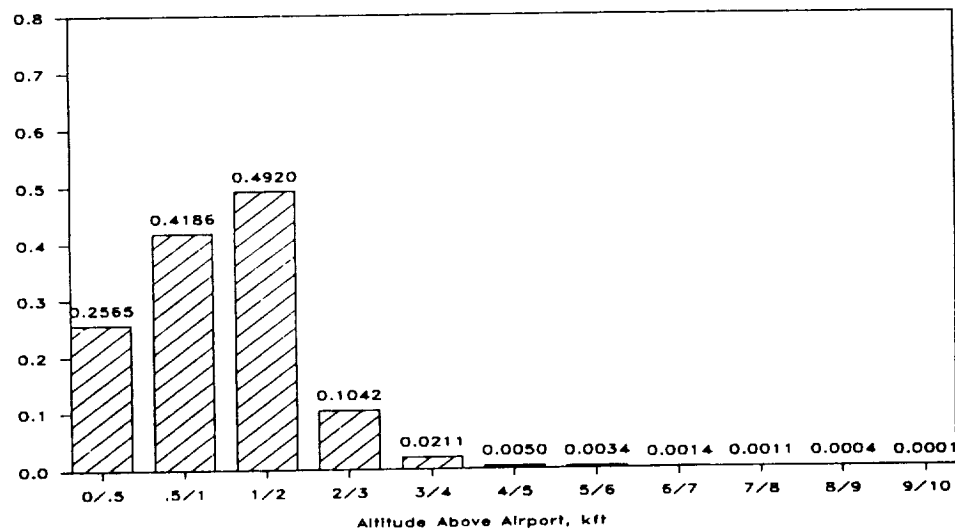
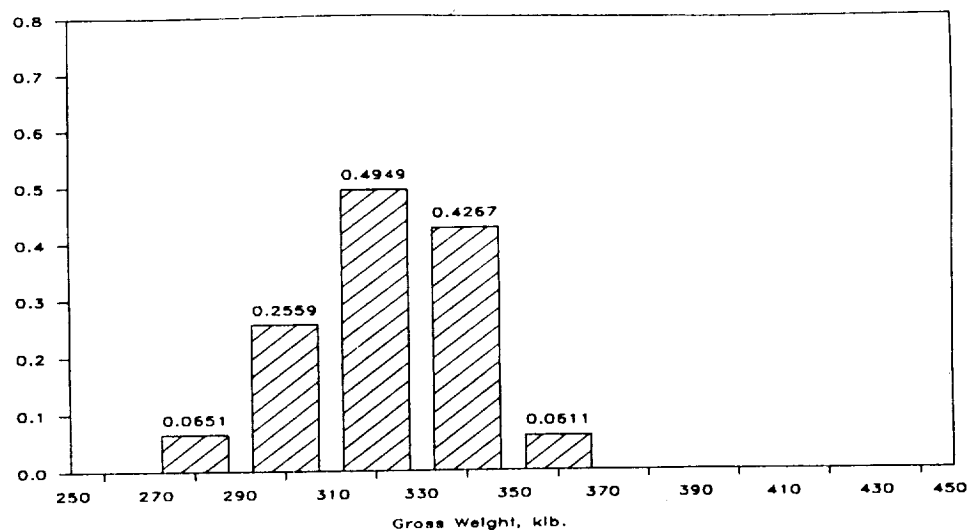
Figure 9. - Continued.

Time in Airspeed or Altitude or Gross Weight Bands with flaps = 33°

Percent Time =

Total Flight Time

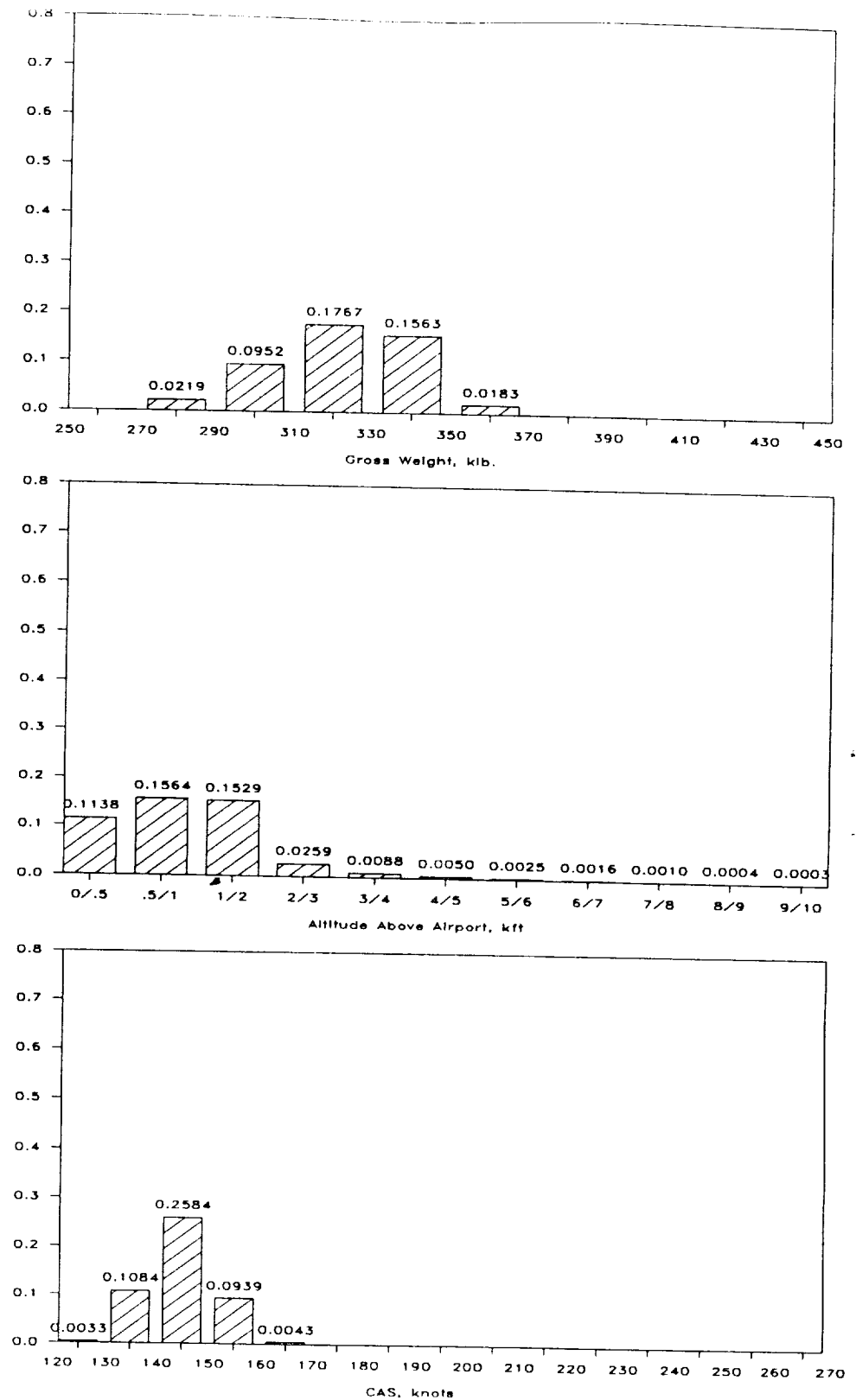
x 100



(f) Landing, flaps = 33°; 21.1119 hours

Figure 9. - Continued.

$$\text{Percent Time} = \frac{\text{Time in Airspeed or Altitude or Gross Weight Bands with flaps} = 42^0}{\text{Total Flight Time}} \times 100$$



(g) Landing, flaps = 42<sup>0</sup>; 7.5845 hours

Figure 9. - Concluded.

# FLAP DEFLECTION, DEGREES

TIME AFTER LIFTOFF MINUTES	30.0	25.0	20.0	14.0	7.0	2.0
0.0 - .1	0	0	0.1	0.2	46.4	0
.1 - .2	0	0	0.1	0	23.1	0
.2 - .3	0	0	0.1	0.1	7.3	1.3
.3 - .4	0	0	0	0.2	2.4	1.3
.4 - .5	0	0	0	0	1.4	6.8
.5 - .6	0	0	0	0	0.9	7.9
.6 - .8	0	0	0	0	1.0	26.5
.8 - 1.0	0	0	0	0	0.2	22.5
1.0 - 1.2	0	0	0	0	0	14.2
1.2 - 1.4	0	0	0	0	0	7.9
1.4 - 1.6	0	0	0	0	0.1	6.0
1.6 - 1.8	0	0	0	0	0	2.4
1.8 - 2.0	0	0	0	0	0	2.0
2.0 - 2.2	0	0	0	0	0	0.2
2.2 - 2.4	0	0	0	0	0	0.3
2.4 - 2.6	0	0	0	0	0	0.3
2.6 - 2.8	0	0	0	0	0	0.1
2.8 - 3.0	0	0	0	0	0	0
3.0 - 3.5	0	0	0	0	0	0
3.5 - 4.0	0	0	0	0	0	0
4.0 - 4.5	0	0	0	0	0	0
4.5 - 5.0	0	0	0	0	0	0
5.0 - 6.0	0	0	0	0	0	0
6.0 - 7.0	0	0	0	0	0	0
7.0 - 8.0	0	0	0	0	0	0
8.0 - 9.0	0	0	0	0	0	0
9.0 - 10.0	0	0	0	0	0	0
10.0 - 15.0	0	0	0	0	0	0
15.0 - 20.0	0	0	0	0	0	0
20.0 - 25.0	0	0	0	0	0	0
0.0 - 25.0	0	0	0.3	0.5	82.8	99.9

## Notes:

1. 914 flights
2. The first 15 seconds after liftoff for each flight are not included.
3. Flap deflections less than 2 degrees were considered to be zero.

(a) Takeoff: Percent of flights vs times when takeoff flap deflection is reduced to less than indicated values

Figure 10.- Flap deflection times.

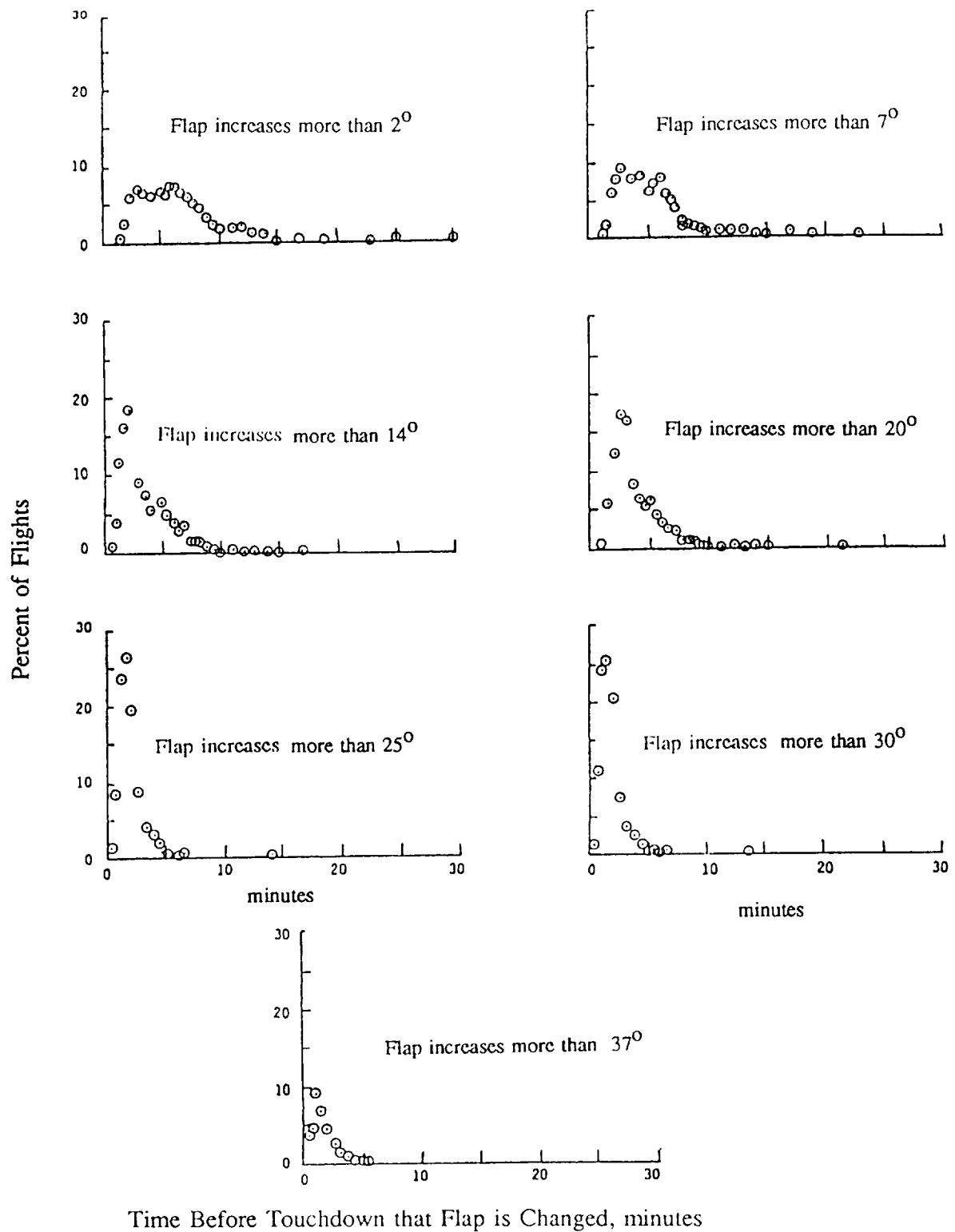
TIME BEFORE TOUCHDOWN MINUTES	FLAP DEFLECTIONS, DEGREES						
	2.0	7.0	14.0	20.0	25.0	30.0	37.0
0.0 - .5	0	0	0	0	1.1	1.5	3.9
.5 - 1.0	0	0	0.8	0.8	8.4	10.4	4.7
1.0 - 1.5	0	0.4	4.0	5.9	23.4	24.7	9.0
1.5 - 2.0	0.7	2.0	11.5	12.3	26.9	25.5	6.5
2.0 - 2.5	2.4	6.3	16.2	17.6	19.7	20.5	4.8
2.5 - 3.0	5.7	8.1	17.3	16.7	8.9	7.5	2.3
3.0 - 3.5	6.8	9.6	9.1	8.4	3.9	3.6	1.1
3.5 - 4.0	6.3	8.0	7.1	6.8	3.0	2.5	1.0
4.0 - 4.5	5.9	8.5	5.7	5.7	2.1	1.8	0.3
4.5 - 5.0	6.9	6.7	6.9	6.3	0.4	0.4	0.2
5.0 - 5.5	6.6	7.5	4.5	4.4	0.5	0.5	0.1
5.5 - 6.0	7.7	8.2	3.6	3.2	0.3	0.2	0
6.0 - 6.5	6.8	5.8	2.8	2.7	0.7	0.7	0
6.5 - 7.0	6.8	5.1	3.0	2.6	0	0	0
7.0 - 7.5	6.0	4.6	1.3	1.0	0	0	0
7.5 - 8.0	5.0	3.3	1.3	1.4	0	0	0
8.0 - 8.5	4.8	3.5	1.3	1.2	0	0	0
8.5 - 9.0	3.5	2.2	1.0	0.9	0	0	0
9.0 - 9.5	3.4	1.5	0.5	0.3	0	0	0
9.5 - 10.0	2.1	1.8	0.2	0.3	0	0	0
10.0 - 11.0	2.2	1.6	0.5	0.3	0	0	0
11.0 - 12.0	2.3	1.3	0.3	0.4	0	0	0
12.0 - 13.0	1.9	1.5	0.2	0.1	0	0	0
13.0 - 14.0	1.6	0.3	0.2	0.2	0.1	0.1	0
14.0 - 15.0	0.5	0.4	0.1	0.1	0	0	0
15.0 - 17.0	0.8	0.7	0.1	0	0	0	0
17.0 - 19.0	0.4	0.3	0	0	0	0	0
19.0 - 21.0	0	0	0	0.1	0	0	0
21.0 - 23.0	0.1	0.1	0	0	0	0	0
23.0 - 25.0	0	0	0	0	0	0	0
25.0 - 30.0	0.4	0	0	0	0	0	0
30.0 - 35.0	0.1	0	0	0	0	0	0
35.0 - 40.0	0	0	0	0	0	0	0
40.0 - 60.0	0.1	0	0	0	0	0	0
0.0 - 60.0	97.8	99.6	99.7	99.9	99.5	100.0	33.9

NOTES:

1. 914 flights
2. The last 15 seconds before touchdown on each flight are not included.
3. Flap deflections less than 2 degrees were considered to be zero.

(b) Landing: Percent of flights vs. time when landing flap deflection is increased to greater than indicated value

Figure 10.- Continued.



(c) Landing: Plots of data from Figure 10(b)

Figure 10. - Concluded.

		KIAS																							
FLAP DEFLECTION RANGE	FLAP DEFLECTION RANGE																								
		120 TO 130 KTS	130 TO 140 KTS	140 TO 150 KTS	150 TO 160 KTS	160 TO 170 KTS	170 TO 180 KTS	180 TO 190 KTS	190 TO 200 KTS	200 TO 210 KTS	210 TO 220 KTS	220 TO 230 KTS	230 KTS	240 KTS	250 KTS	260 KTS	270 KTS	280 KTS	290 KTS	300 KTS	310 KTS	320 KTS			
37-45	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
30-37	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
25-30	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
20-25	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
14-20	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7-14	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2-7	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	

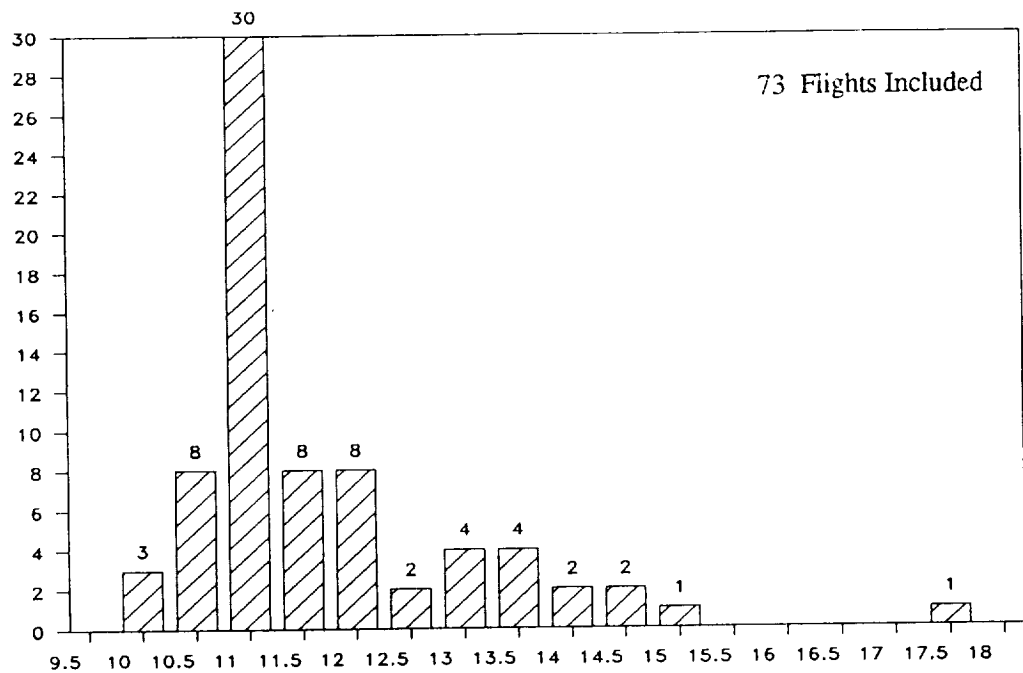
(a) Takeoff

		KIAS																							
FLAP DEFLECTION RANGE	FLAP DEFLECTION RANGE																								
		120 TO 130 KTS	130 TO 140 KTS	140 TO 150 KTS	150 TO 160 KTS	160 TO 170 KTS	170 TO 180 KTS	180 KTS	190 KTS	200 KTS	210 KTS	220 KTS	230 KTS	240 KTS	250 KTS	260 KTS	270 KTS	280 KTS	290 KTS	300 KTS	310 KTS	320 KTS			
37-40	42	0	1	10	17	5	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
30-37	33	0	0	7	54	37	4	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
25-30	27	0	0	5	42	45	4	18	21	18	13	1	0	0	0	0	0	0	0	0	0	0	0	1	
20-25	22	0	0	0	6	18	21	17	16	21	4	0	0	0	0	0	0	0	0	0	0	0	0	2	
14-20	18	0	0	0	4	14	21	3	8	17	24	31	6	0	0	0	0	0	0	0	0	0	0	2	
7-14	10	0	0	0	0	1	3	0	0	7	8	16	22	25	8	0	0	0	0	0	0	0	0	0	
2-7	4	0	0	0	0	0	0	0	0	0	8	16	16	22	25	8	0	0	0	0	0	0	0	0	

(b) Landing

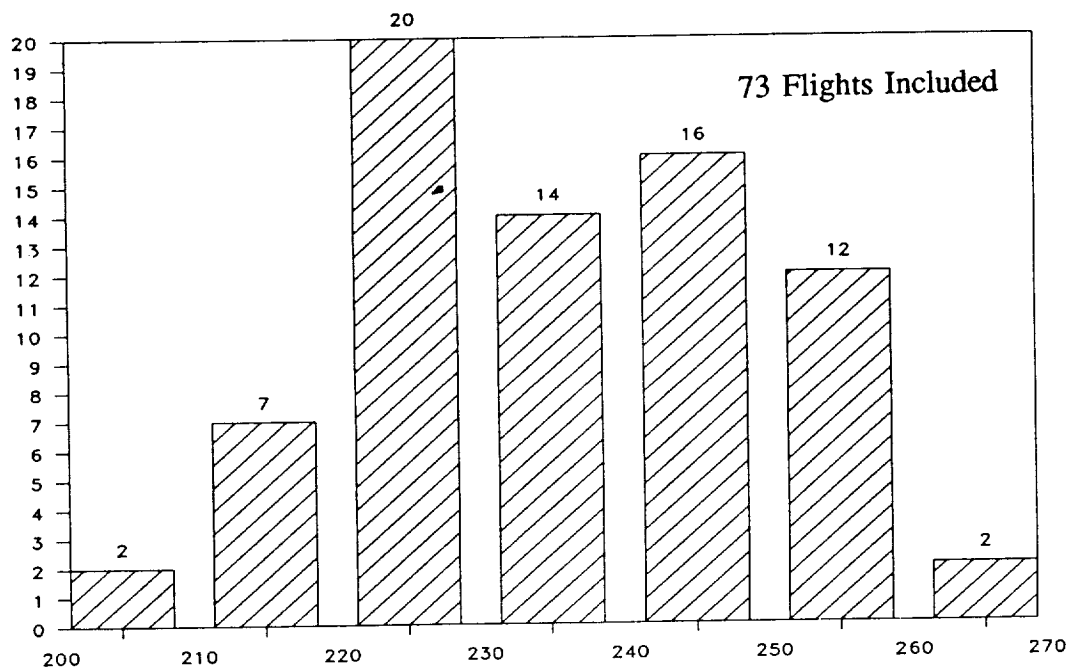
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Figure 11.- Percent of flights vs. equivalent airspeed at flap detent change.



(a) Pressure altitude at initial flap deflection, kft

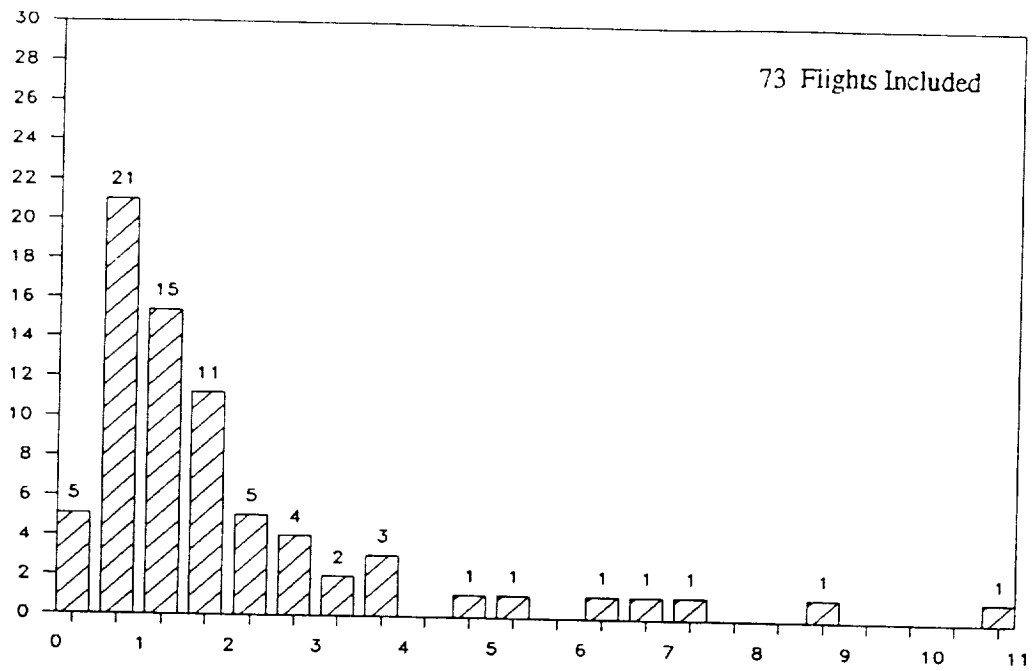
Number of Flights



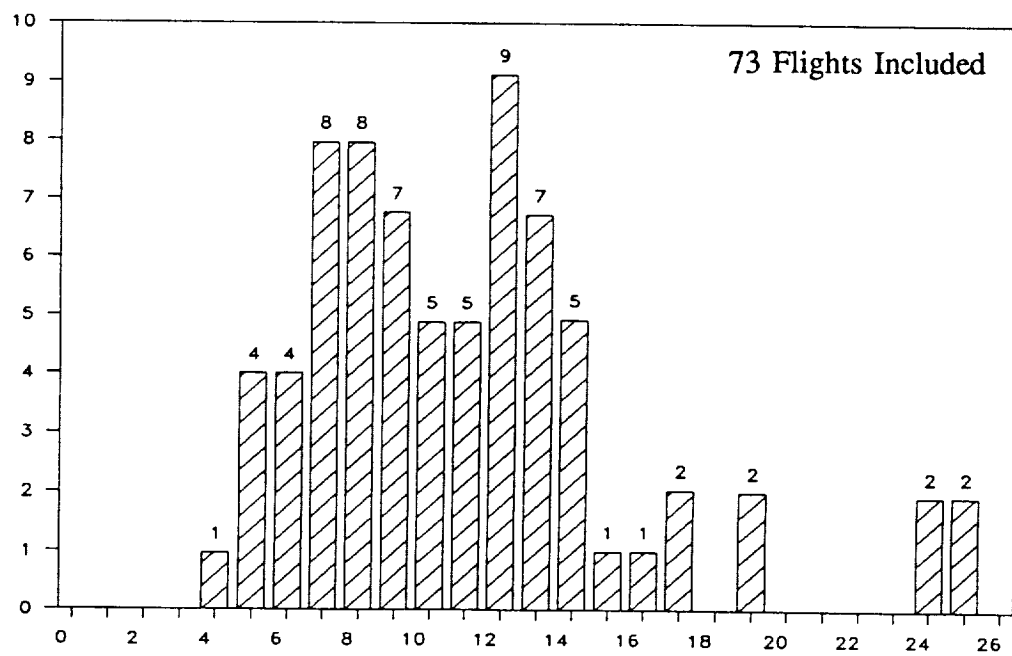
(b) Calibrated airspeed at initial flap deflection, kts

Figure 12.- Flap use above 10,000 feet pressure altitude.

Number of Flights



(c) Minutes above 10,000 ft. that flaps deflected > 2 deg



(d) Minutes before touchdown of initial flap deflection

Figure 12.- Concluded.

PRESSURE ALTITUDE BANDS

$a_n$	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
LEVEL										
g's										
1.60	0	0	0	0	0	0	0	0	0	0
1.40	0	0	0	0	0	0	0	0	0	0
1.20	0	0	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0	0	0
.80	0	0.01	0.01	0	0	0	0	0	0	0
.70	0	0.03	0.01	0	0	0	0	0	0	0
.60	0	0.06	0.03	0.01	0	0	0	0	0	0.01
.50	0	0.12	0.10	0.04	0	0	0.02	0	0	0.02
.40	0.13	0.36	0.28	0.17	0.01	0.01	0.04	0.01	0	0.07
.30	1.57	1.37	0.97	0.65	0.24	0.09	0.10	0.03	0	0.35
.20	14.58	9.31	5.89	3.41	1.21	0.80	0.58	0.39	0	2.64
.15	43.58	25.84	15.83	9.58	3.83	2.54	1.82	1.26	0	7.71
.10	140.52	101.17	64.10	35.52	17.95	13.09	8.71	6.70	4.76	29.44
.05	362.38	208.06	194.39	148.89	115.24	92.28	67.81	53.17	70.77	108.65
0.00	865.02	811.63	947.45	1041.56	1123.34	1301.39	1533.91	1677.95	1741.76	1403.05
-.05	283.09	148.22	135.16	122.23	90.73	71.59	57.67	48.77	93.94	87.25
-.10	74.69	39.01	34.15	23.99	13.69	9.82	7.81	6.05	10.47	17.00
-.15	17.14	9.77	8.40	6.26	3.11	1.73	1.61	1.20	0.95	3.87
-.20	4.42	3.36	3.31	2.31	1.06	0.55	0.49	0.35	0.32	1.22
-.30	0.34	0.64	0.55	0.36	0.13	0.02	0.08	0.04	0	0.16
-.40	0.04	0.17	0.14	0.14	0.02	0	0.02	0.01	0	0.04
-.50	0	0.06	0.04	0.06	0	0	0.01	0	0	0.01
-.60	0	0.03	0	0.01	0	0	0.01	0	0	0
-.70	0	0.01	0	0	0	0	0.01	0	0	0
-.80	0	0	0	0	0	0	0	0	0	0
-1.00	0	0	0	0	0	0	0	0	0	0
-1.20	0	0	0	0	0	0	0	0	0	0
-1.40	0	0	0	0	0	0	0	0	0	0
-1.60	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT	119.38	108.04	108.72	77.17	83.30	110.42	266.52	742.54	3.15	1619.24
FLIGHT MILES @ ALT	24014.89	29500.10	37757.93	31445.86	36596.70	52344.52	131369.92	363808.53	1545.14	708383.60
										914
										TOTAL FLIGHTS
										TOTAL FLIGHT HOURS FLAPS UP AND DOWN
										1619.24
										TOTAL FLIGHT MILES FLAPS UP AND DOWN
										708383.60

(a)  $a_n$  level crossing counts per hour within pressure altitude bands

Figure 13.- Normal acceleration exceedances.

(b)  $a_{nM}$  level crossing counts per hour within pressure altitude bands

Figure 13.- Continued.

PRESSURE ALTITUDE BANDS

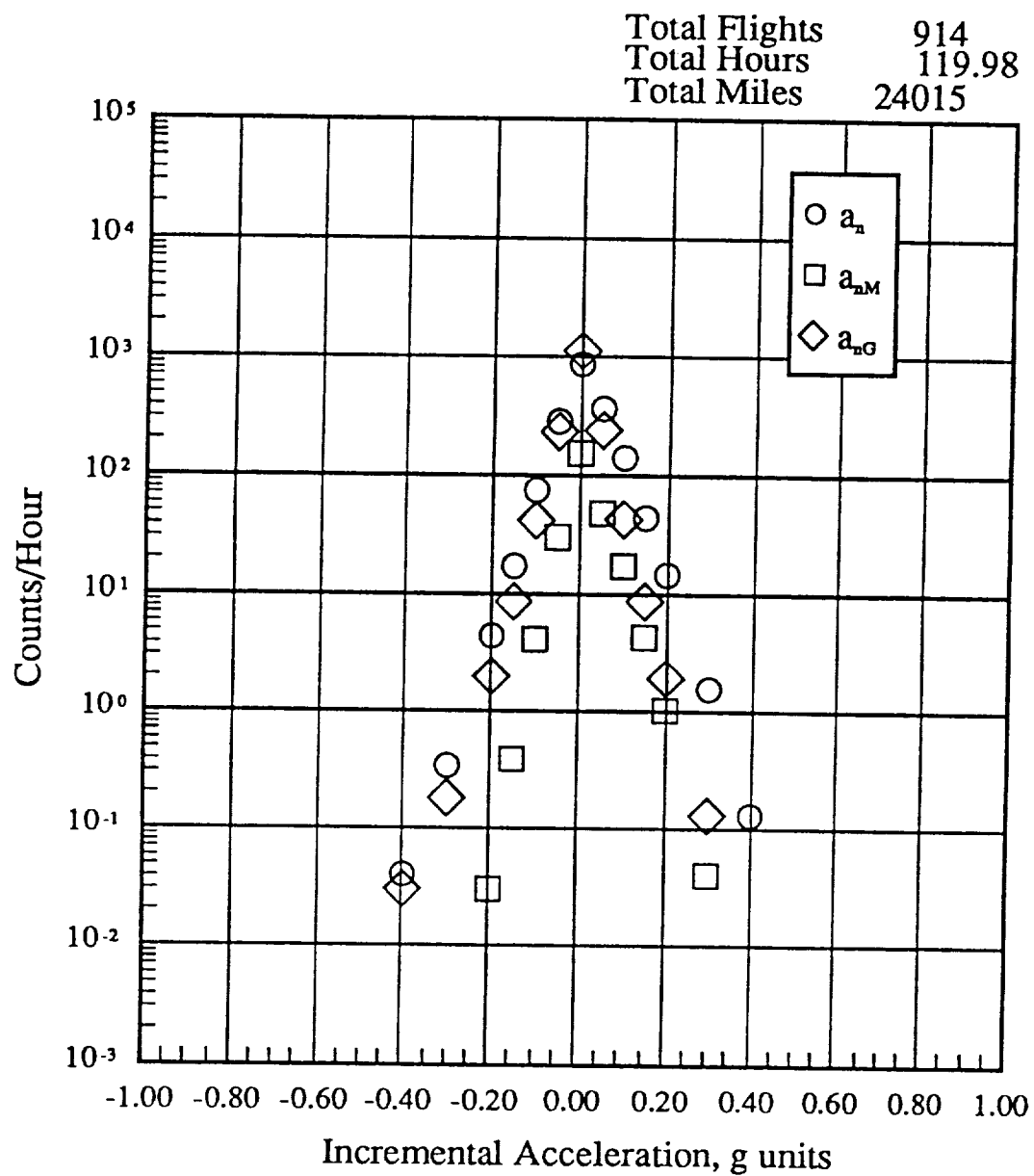
<sup>a</sup> <sub>mg</sub>	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
LEVEL g's										
1.60	0	0	0	0	0	0	0	0	0	0
1.40	0	0	0	0	0	0	0	0	0	0
1.20	0	0	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0	0	0
.80	0	0	0	0	0	0	0	0	0	0
.70	0	0	0.01	0	0	0	0	0	0	0
.60	0	0.02	0.02	0	0	0	0	0	0	0.01
.50	0	0.06	0.03	0.03	0	0	0	0	0	0.02
.40	0	0.14	0.13	0.04	0.01	0	0.01	0	0	0.09
.30	0.13	0.35	0.40	0.26	0.02	0.01	0.06	0.01	0	0.54
.20	1.94	1.80	1.70	1.10	0.24	0.14	0.20	0.11	0	1.87
.15	8.73	5.00	4.67	2.84	0.95	0.59	0.72	0.51	0	8.07
.10	42.48	17.92	15.35	9.56	4.31	3.29	3.37	2.73	0.95	50.21
.05	239.27	92.41	72.85	50.69	31.24	27.47	27.95	23.90	32.37	1552.74
0	1121.52	1205.66	1383.02	1505.45	1602.97	1623.82	1647.05	1651.64	1702.41	49.83
-.05	232.50	94.22	73.75	51.73	32.35	27.29	27.53	23.69	31.74	7.91
-.10	41.39	17.75	15.44	9.25	4.57	3.31	3.26	2.62	1.27	1.82
-.15	8.64	4.98	4.68	2.73	0.92	0.67	0.68	0.45	0	0.56
-.20	1.99	2.02	1.89	1.10	0.18	0.19	0.20	0.10	0	0.09
-.30	0.18	0.45	0.36	0.19	0.02	0	0.03	0.01	0	0.02
-.40	0.03	0.14	0.08	0.06	0	0	0.01	0	0	0.01
-.50	0	0.06	0.03	0.01	0	0	0.01	0	0	0
-.60	0	0.01	0	0.01	0	0	0.01	0	0	0
-.70	0	0.01	0	0	0	0	0.01	0	0	0
-.80	0	0.01	0	0	0	0	0	0	0	0
-1.00	0	0	0	0	0	0	0	0	0	0
-1.20	0	0	0	0	0	0	0	0	0	0
-1.40	0	0	0	0	0	0	0	0	0	0
-1.60	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT	119.38	108.04	108.72	77.17	83.30	110.42	266.52	742.54	3.15	1619.24
FLIGHT MILES @ ALT	24014.89	29500.10	37757.93	31445.86	36596.70	52344.52	131369.92	363808.53	1545.14	708383.60
										914
										1619.24
										708383.60

TOTAL FLIGHTS

TOTAL FLIGHT HOURS FLAPS UP AND DOWN

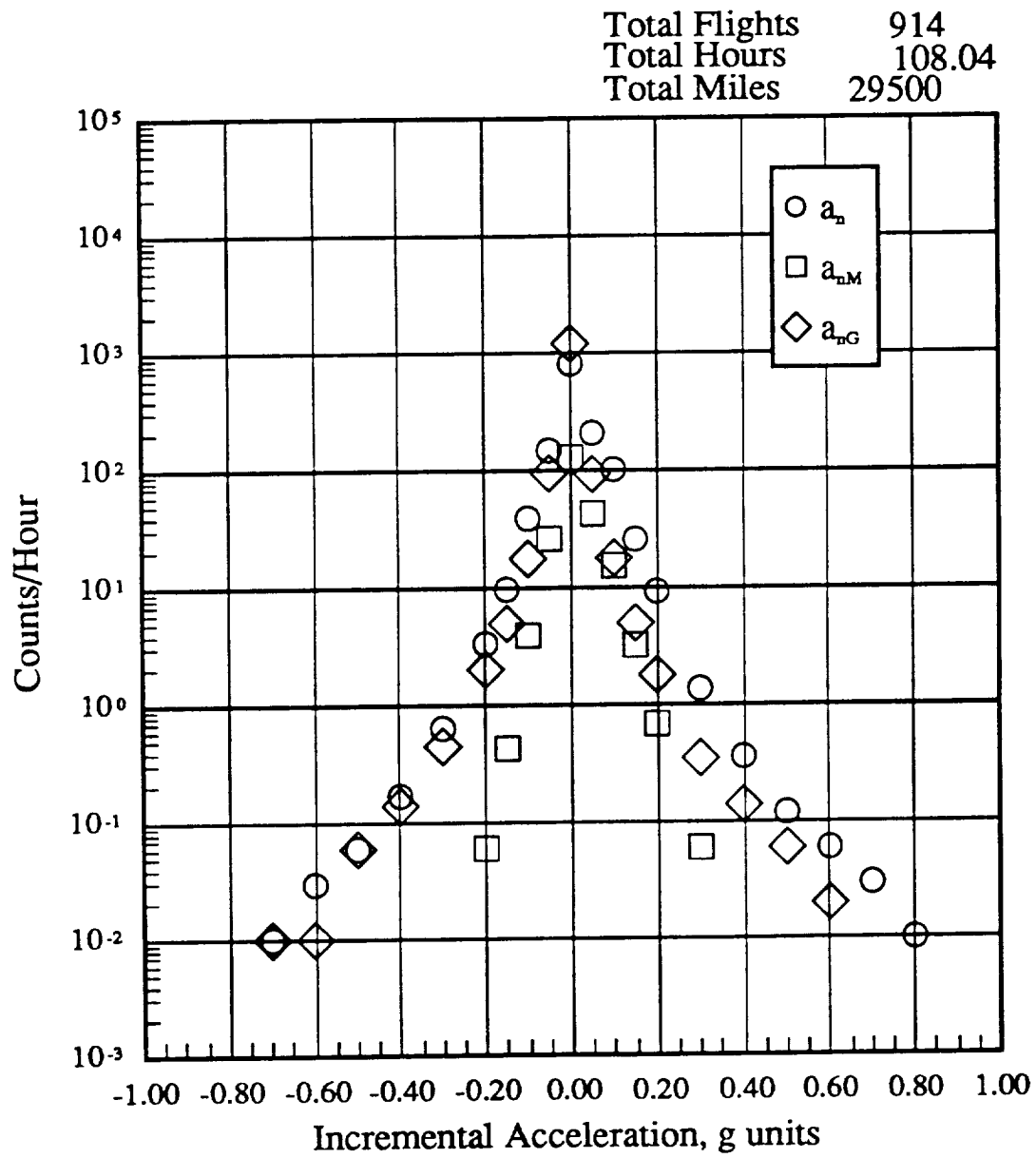
TOTAL FLIGHT MILES FLAPS UP AND DOWN

(c)  $a_{1G}$  level crossing counts per hour within pressure altitude bands



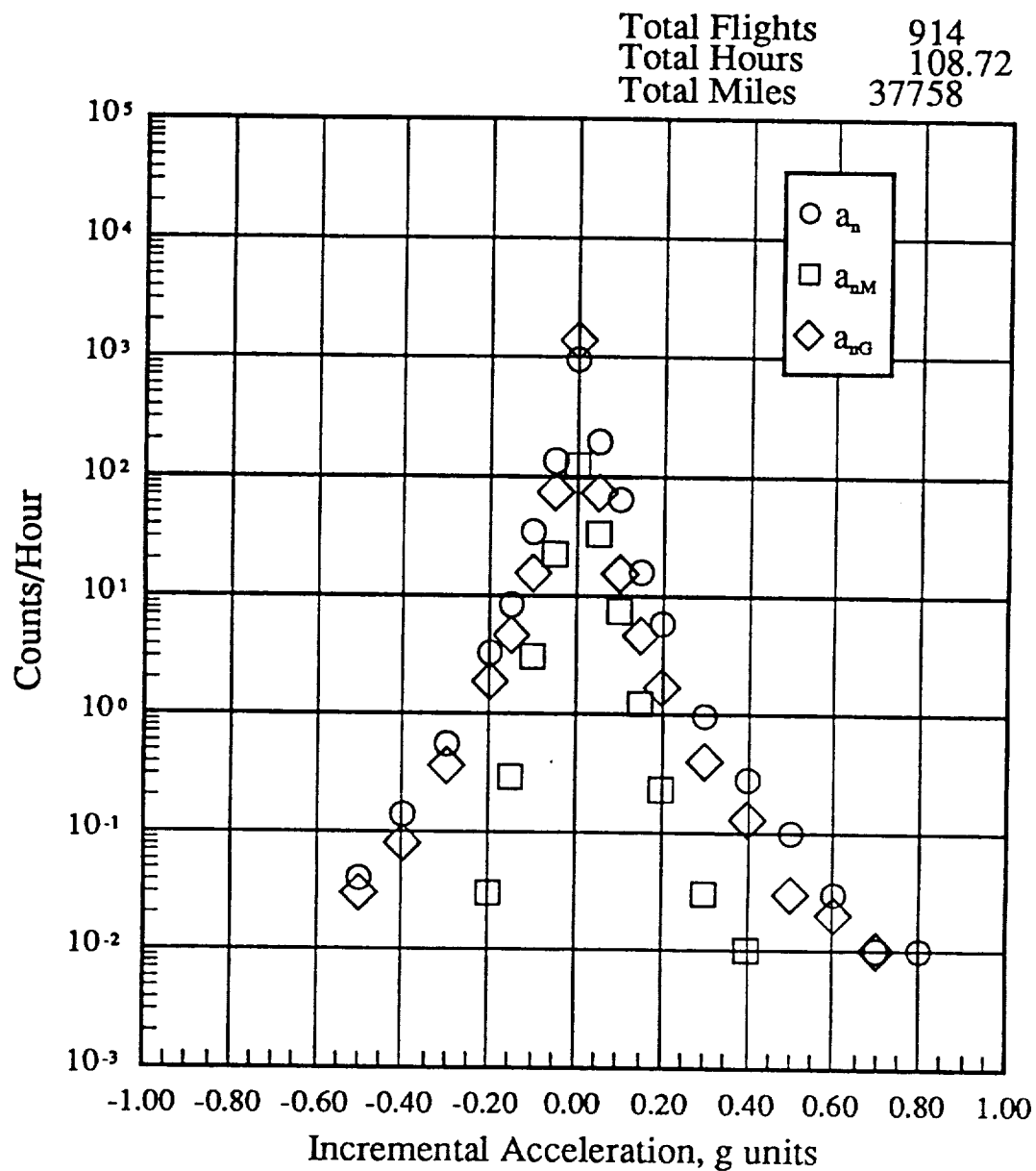
(d)  $a_n$ ,  $a_{nM}$ ,  $a_{nG}$ , -500 to 4500 feet altitude

Figure 13.- Continued.



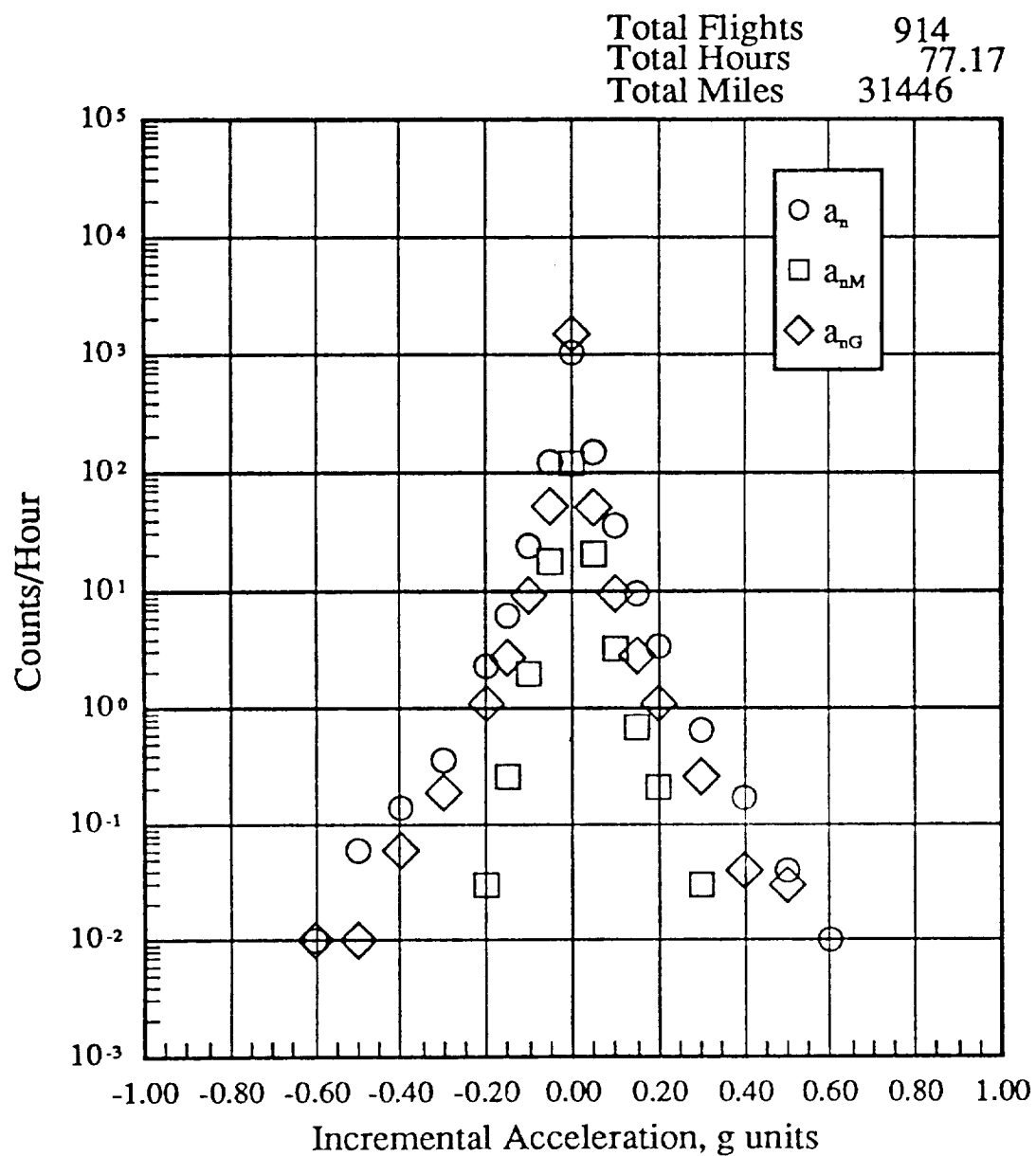
(e)  $a_n$ ,  $a_{nM}$ ,  $a_{nG}$ , 4500 to 9500 feet altitude

Figure 13.- Continued.



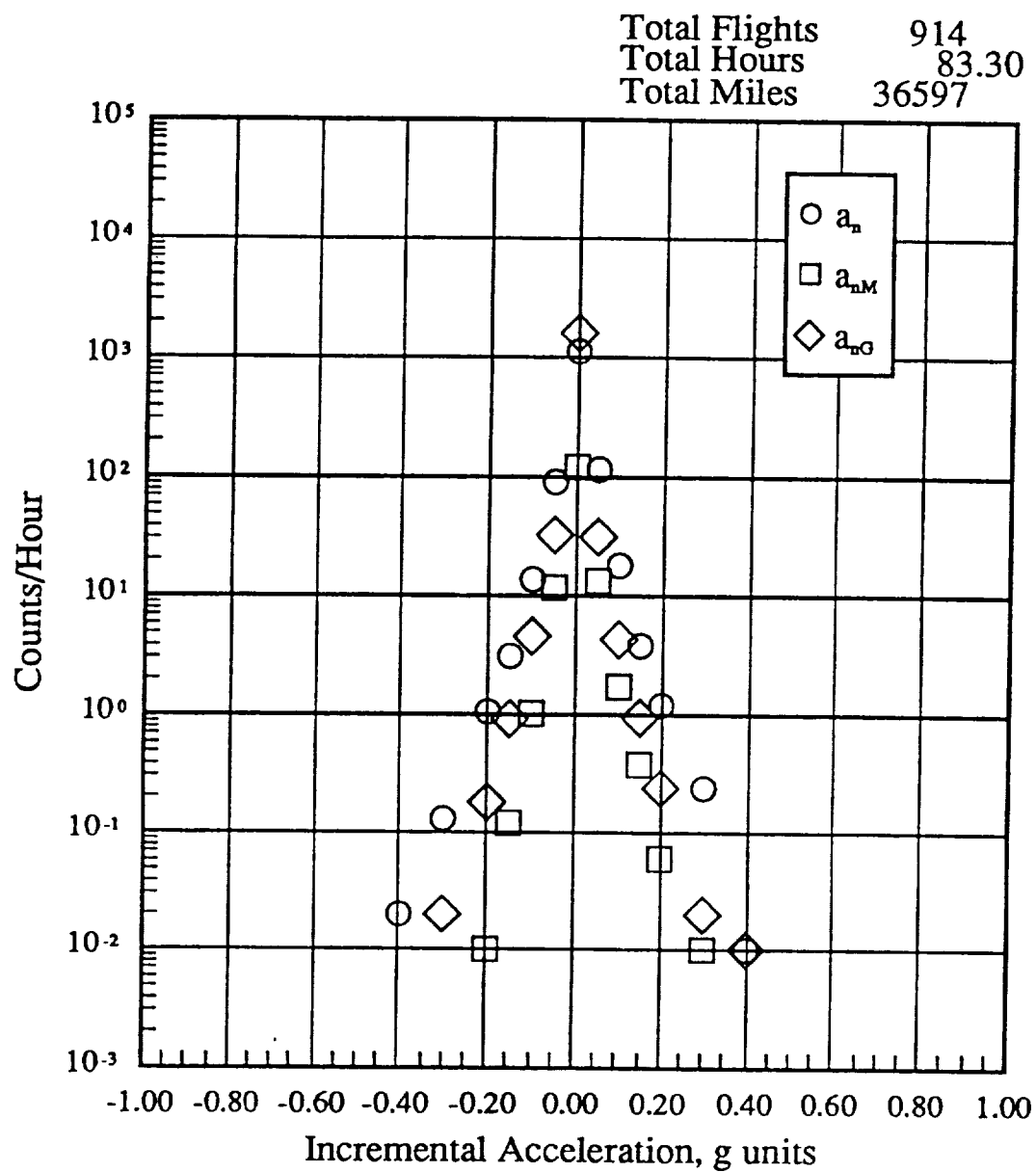
(f)  $a_n$ ,  $a_{nM}$ ,  $a_{nG}$ , 9500 to 14500 feet altitude

Figure 13.- Continued.



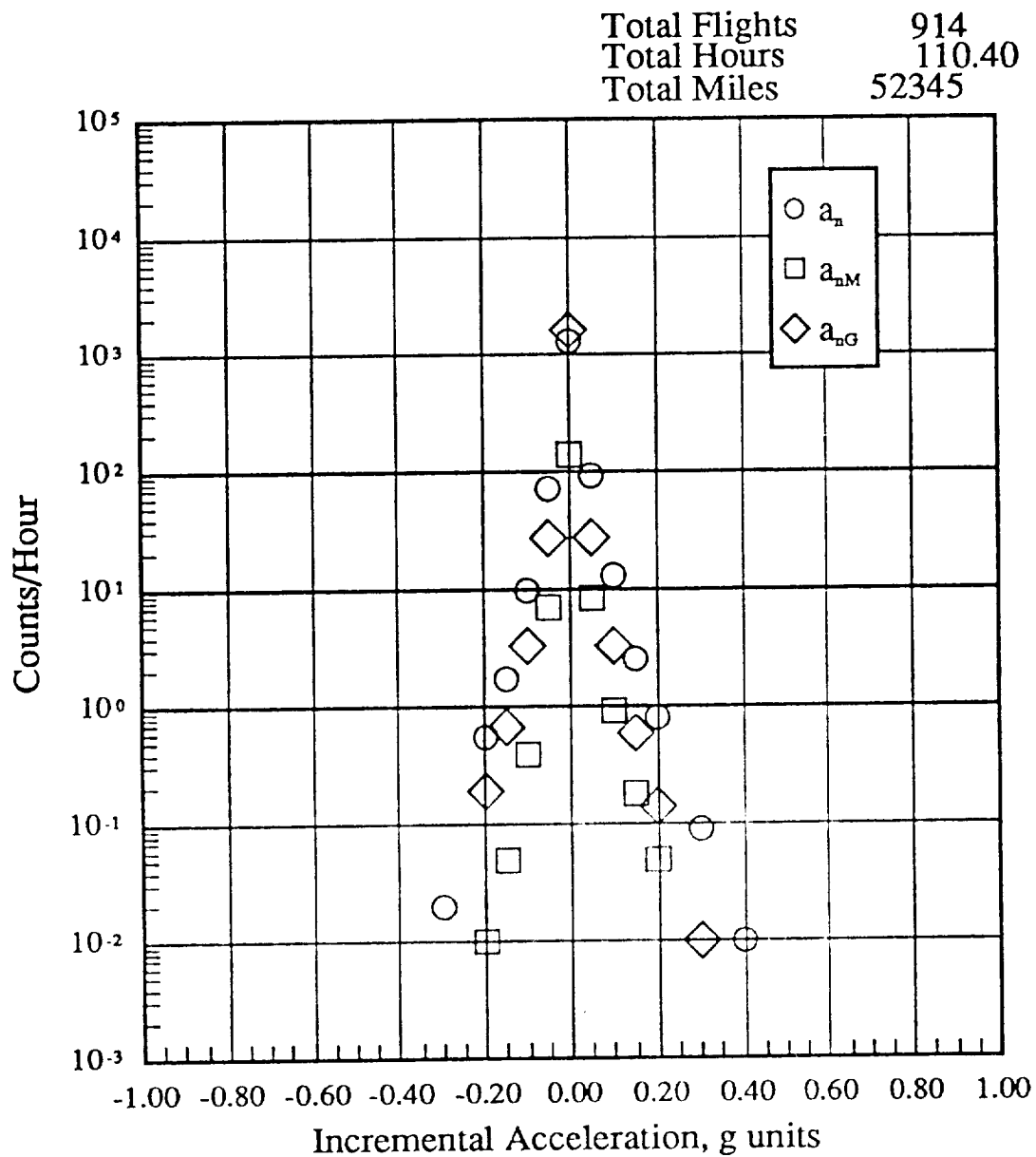
(g)  $a_n$ ,  $a_{nM}$ ,  $a_{nG}$ , 14500 to 19500 feet altitude

Figure 13.- Continued.



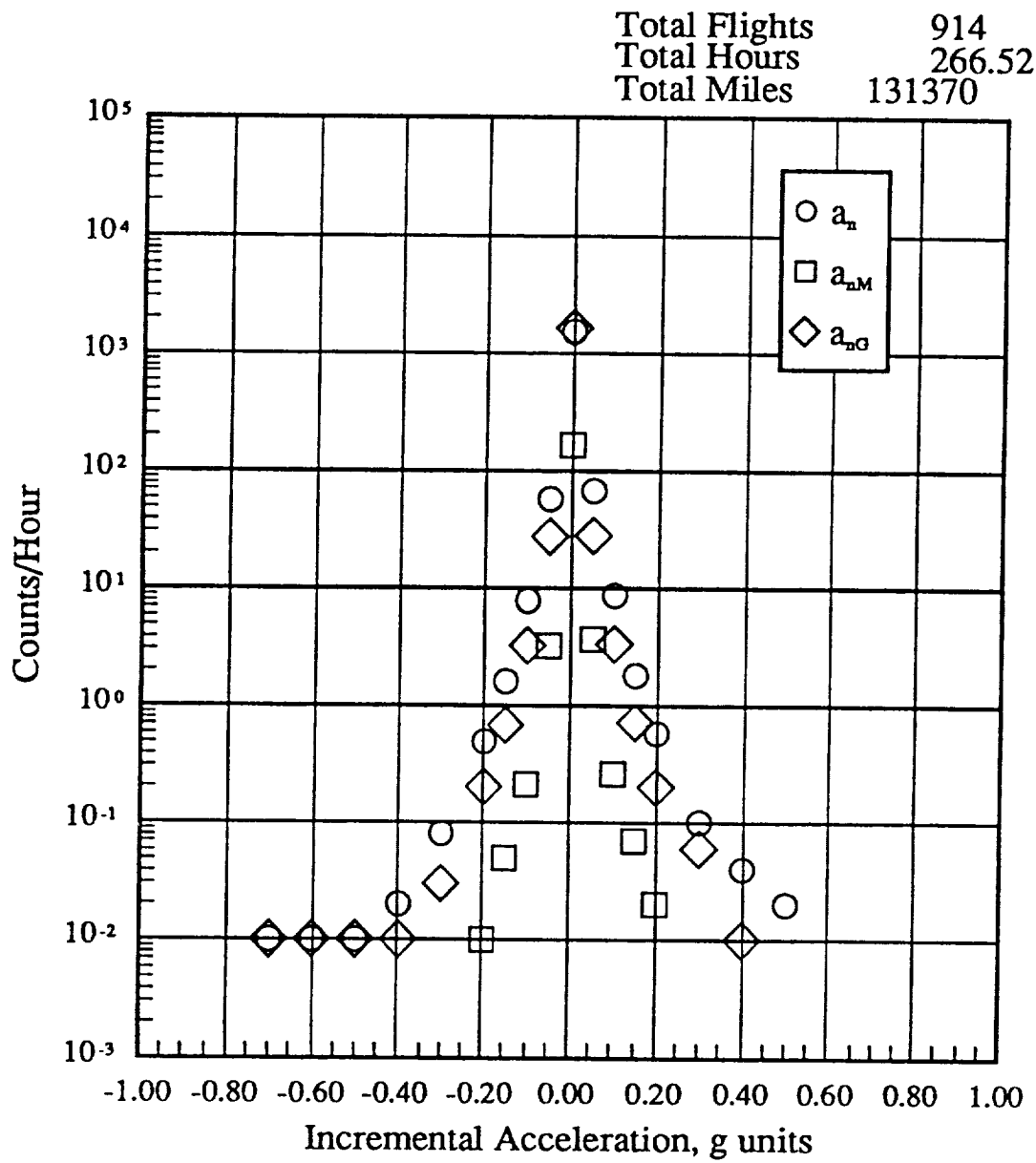
(h)  $a_n$ ,  $a_{nM}$ ,  $a_{nG}$ , 19500 to 24500 feet altitude

Figure 13.- Continued.



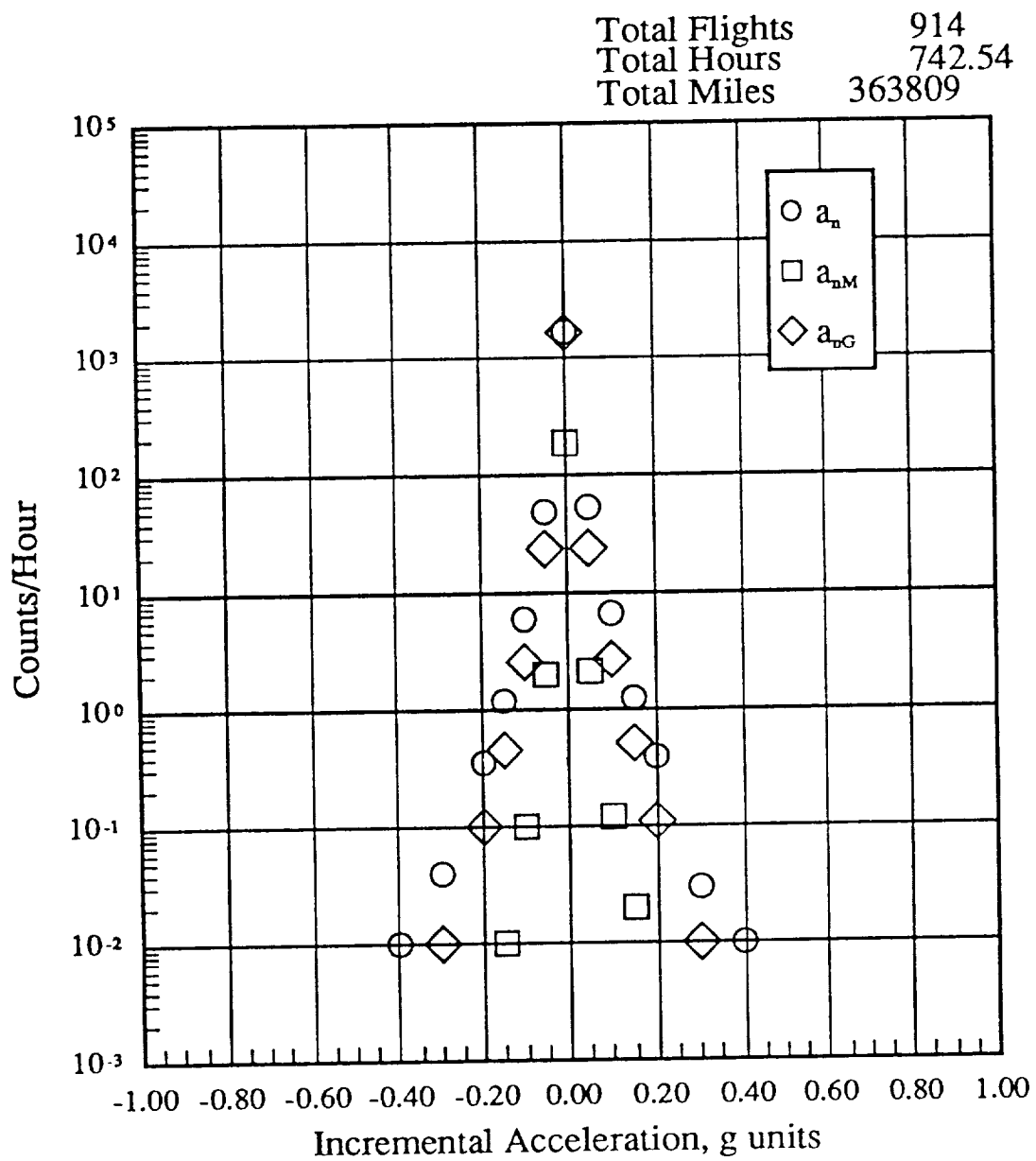
(i)  $a_n$ ,  $a_{nM}$ ,  $a_{nG}$ , 24500 to 29500 feet altitude

Figure 13.- Continued.



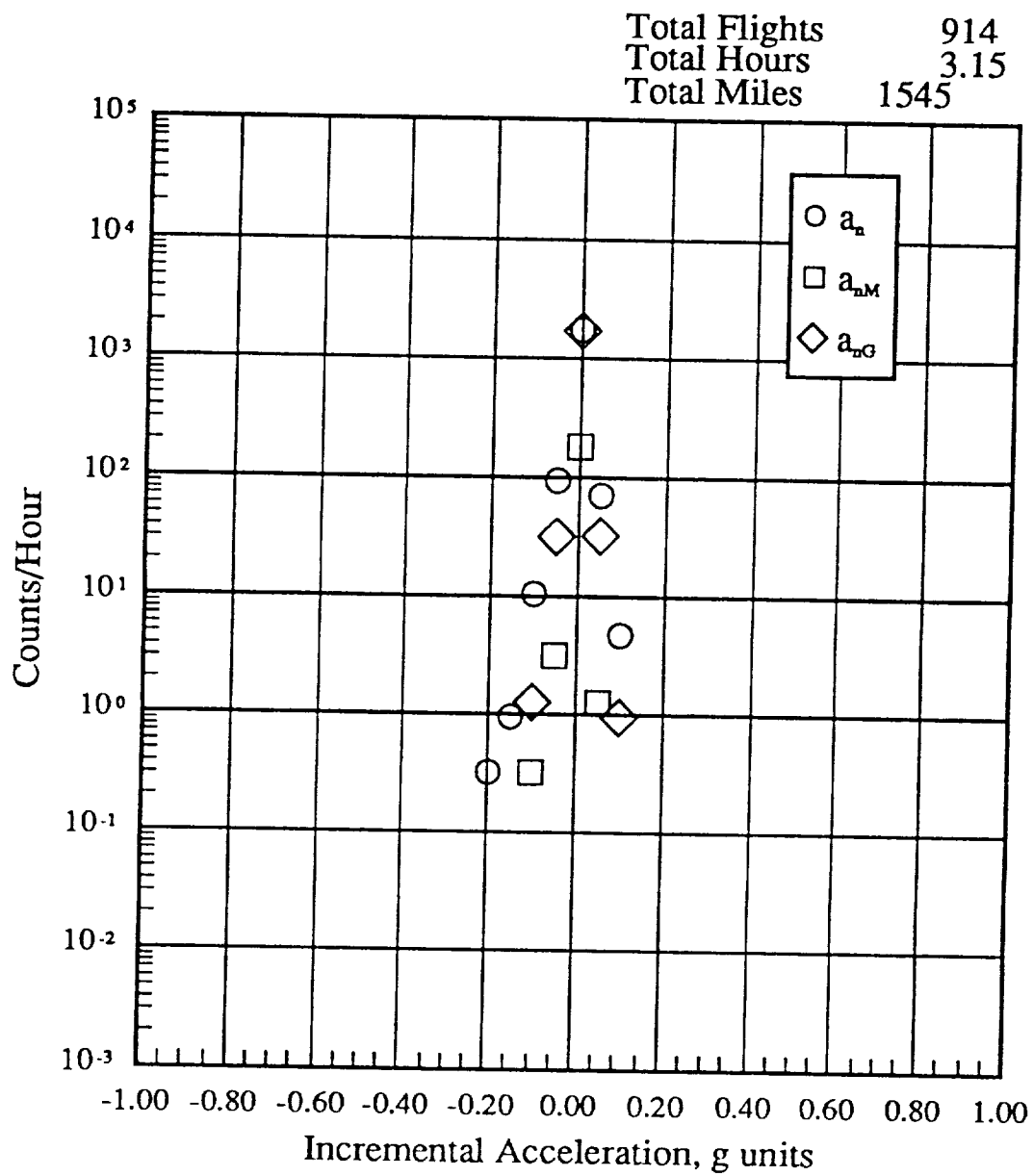
(j)  $a_n$ ,  $a_{nM}$ ,  $a_{nG}$ , 29500 to 34500 feet altitude

Figure 13.- Continued.



(k)  $a_n$ ,  $a_{nM}$ ,  $a_{nG}$ , 34500 to 39500 feet altitude

Figure 13.- Continued.



(l)  $a_n$ ,  $a_{nM}$ ,  $a_{nG}$ , 39500 to 44500 feet altitude

Figure 13.- Continued.

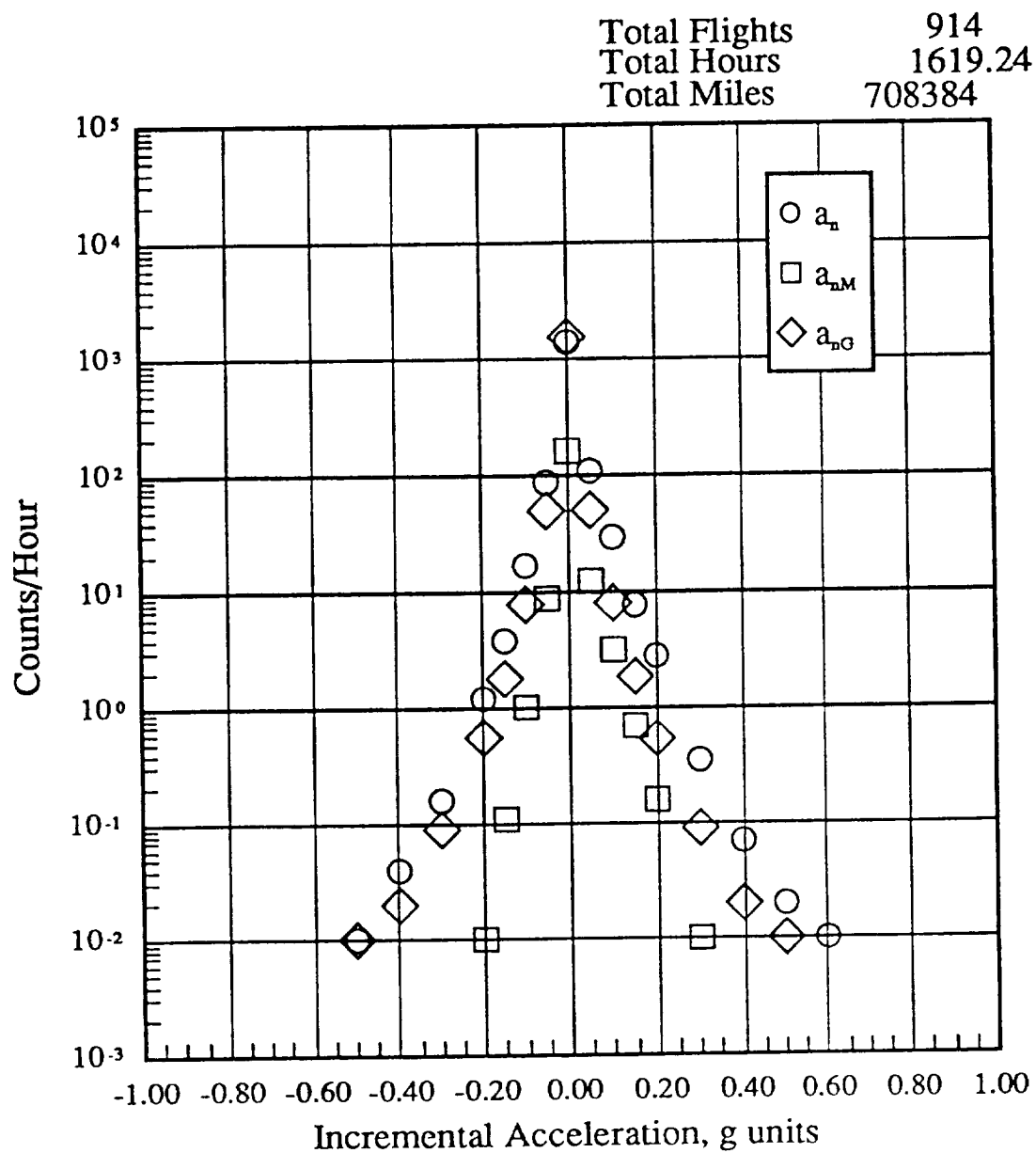


Figure 13.- Concluded.

PRESSURE ALTITUDE BANDS

a <sub>y</sub> g's	-500 TO		4500 TO		9500 TO		14500 TO		19500 TO		24500 TO		29500 TO		34500 TO		39500 TO		-500 TO	
	4500 FT		9500 FT		14500 FT		19500 FT		24500 FT		29500 FT		34500 FT		39500 FT		44500 FT		44500 FT	
.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.08	0.01	0.04	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
.06	0.59	0.43	0.43	0.43	0.43	0.43	0.27	0.08	0.11	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
.04	3.47	1.89	1.89	1.78	1.78	1.78	0.83	0.44	0.37	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
.02	28.28	12.22	12.22	10.33	10.33	10.33	6.10	3.27	2.79	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01
0	178.39	84.20	84.20	74.01	74.01	74.01	58.79	40.25	29.99	20.82	20.82	20.82	20.82	20.82	20.82	20.82	20.82	20.82	20.82	20.82
-.02	859.73	718.92	718.92	727.68	727.68	727.68	768.95	787.00	969.87	1323.92	1323.92	1323.92	1323.92	1323.92	1323.92	1323.92	1323.92	1323.92	1323.92	1323.92
-.04	430.65	172.22	172.22	120.92	120.92	120.92	81.14	47.85	33.95	25.77	25.77	25.77	25.77	25.77	25.77	25.77	25.77	25.77	25.77	25.77
-.06	56.94	19.50	19.50	11.39	11.39	11.39	6.97	2.59	2.12	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
-.08	6.73	2.76	2.76	1.94	1.94	1.94	1.21	0.40	0.26	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
-.12	0.86	0.63	0.63	0.50	0.50	0.50	0.29	0.16	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
-.16	0.06	0.12	0.12	0.06	0.06	0.06	0.04	0	0	0	0	0	0	0	0	0	0	0	0	0
-.20	0	0.04	0.04	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0
-.24	0	0.01	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT	119.38	108.04	108.04	108.72	108.72	108.72	77.17	83.30	110.42	266.52	742.54	3.15	1619.24	1619.24	1619.24	1619.24	1619.24	1619.24	1619.24	1619.24
FLIGHT MILES @ ALT	24014.89	29500.10	29500.10	37757.93	37757.93	37757.93	31445.86	36596.70	52344.52	131369.92	363808.53	1545.14	708383.60	708383.60	708383.60	708383.60	708383.60	708383.60	708383.60	708383.60

TOTAL FLIGHTS  
TOTAL FLIGHT HOURS FLAPS UP AND DOWN  
TOTAL FLIGHT MILES FLAPS UP AND DOWN

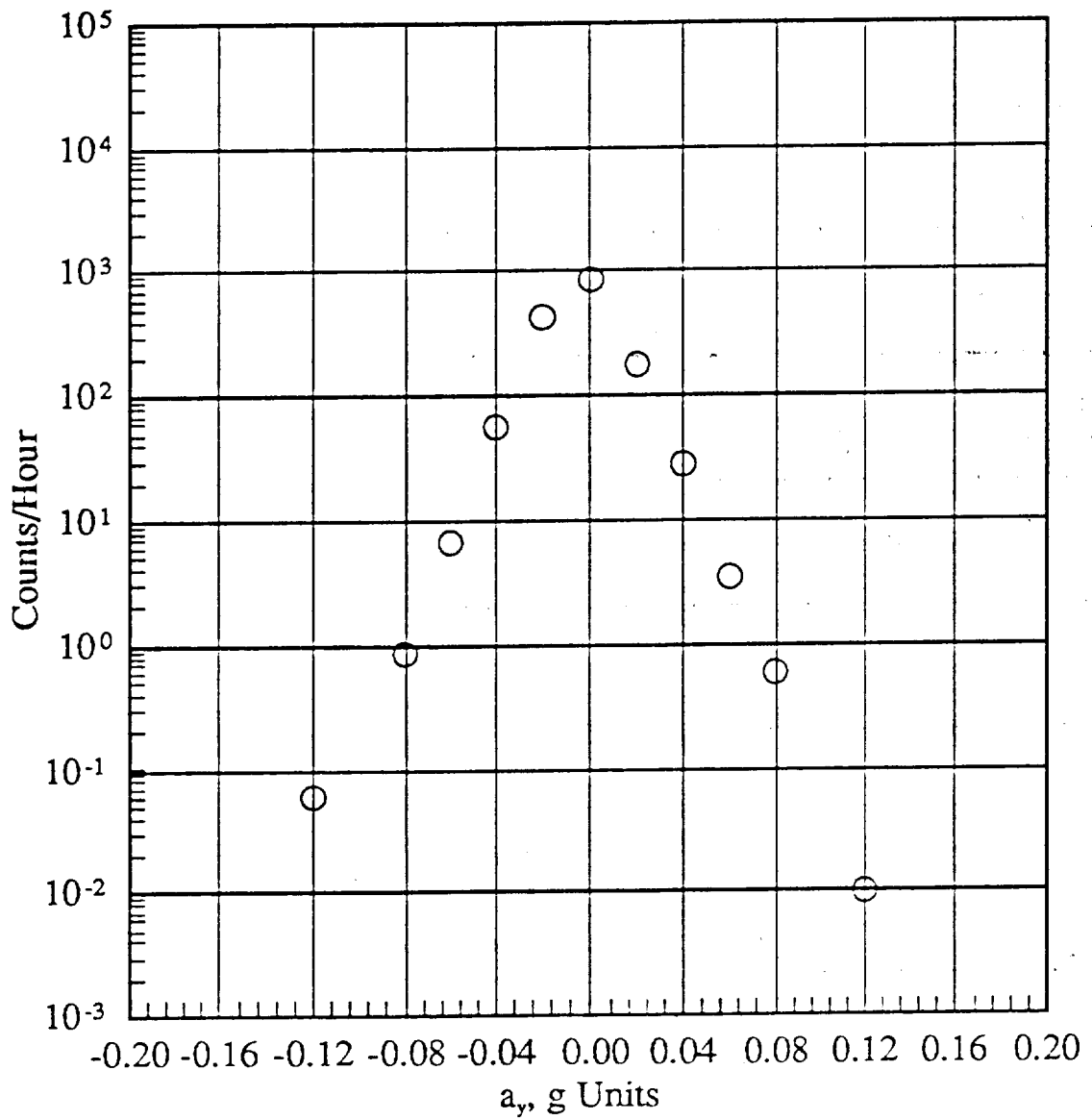
914

1619.24  
708383.60

(a) a<sub>y</sub> Level crossing counts per hour with in pressure altitude bands

Figure 14.- Lateral acceleration exceedances.

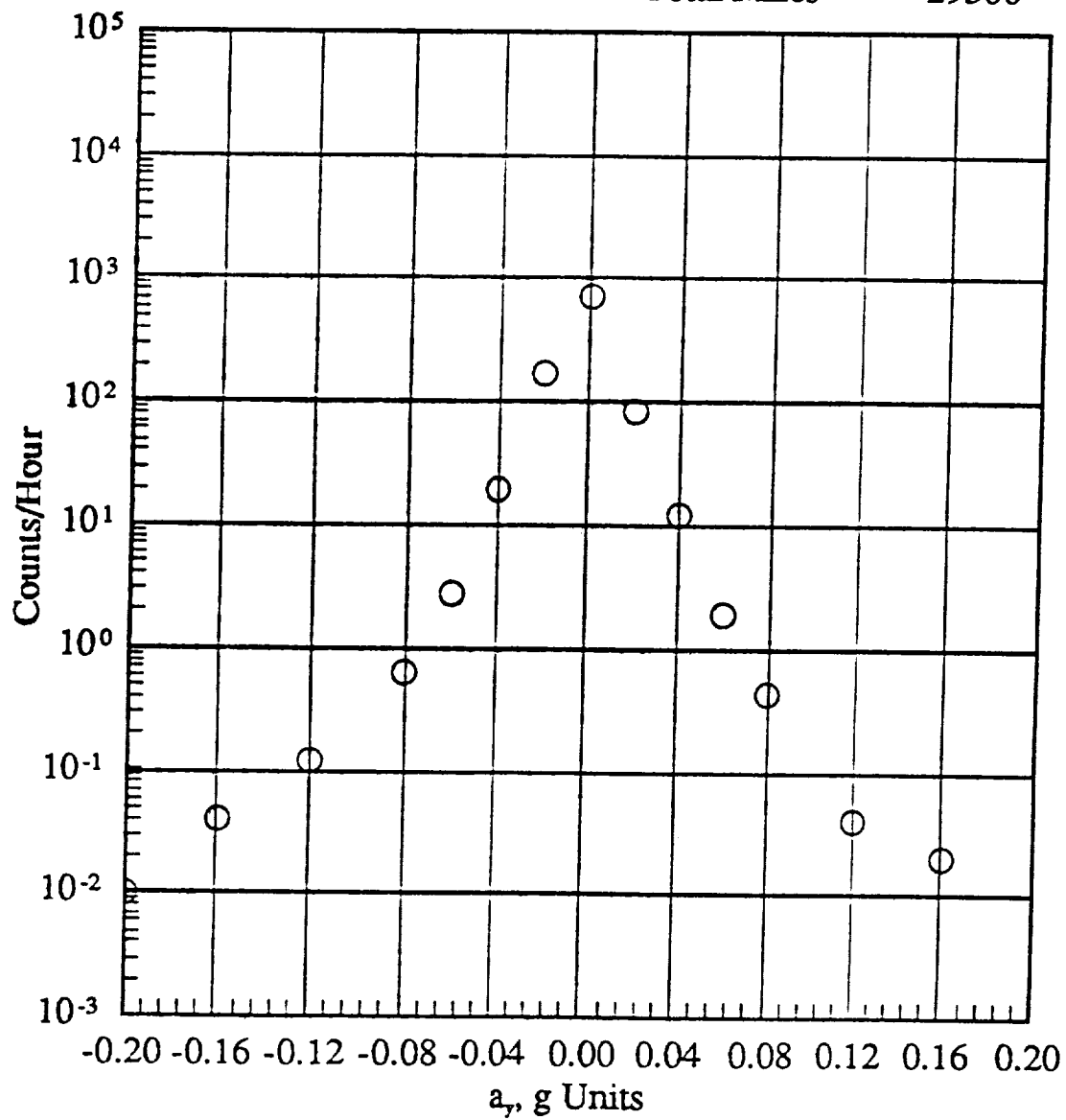
Total Flights	914
Total Hours	119.88
Total Miles	24015



(b) -500 to 4500 feet altitude

Figure 14.- Continued.

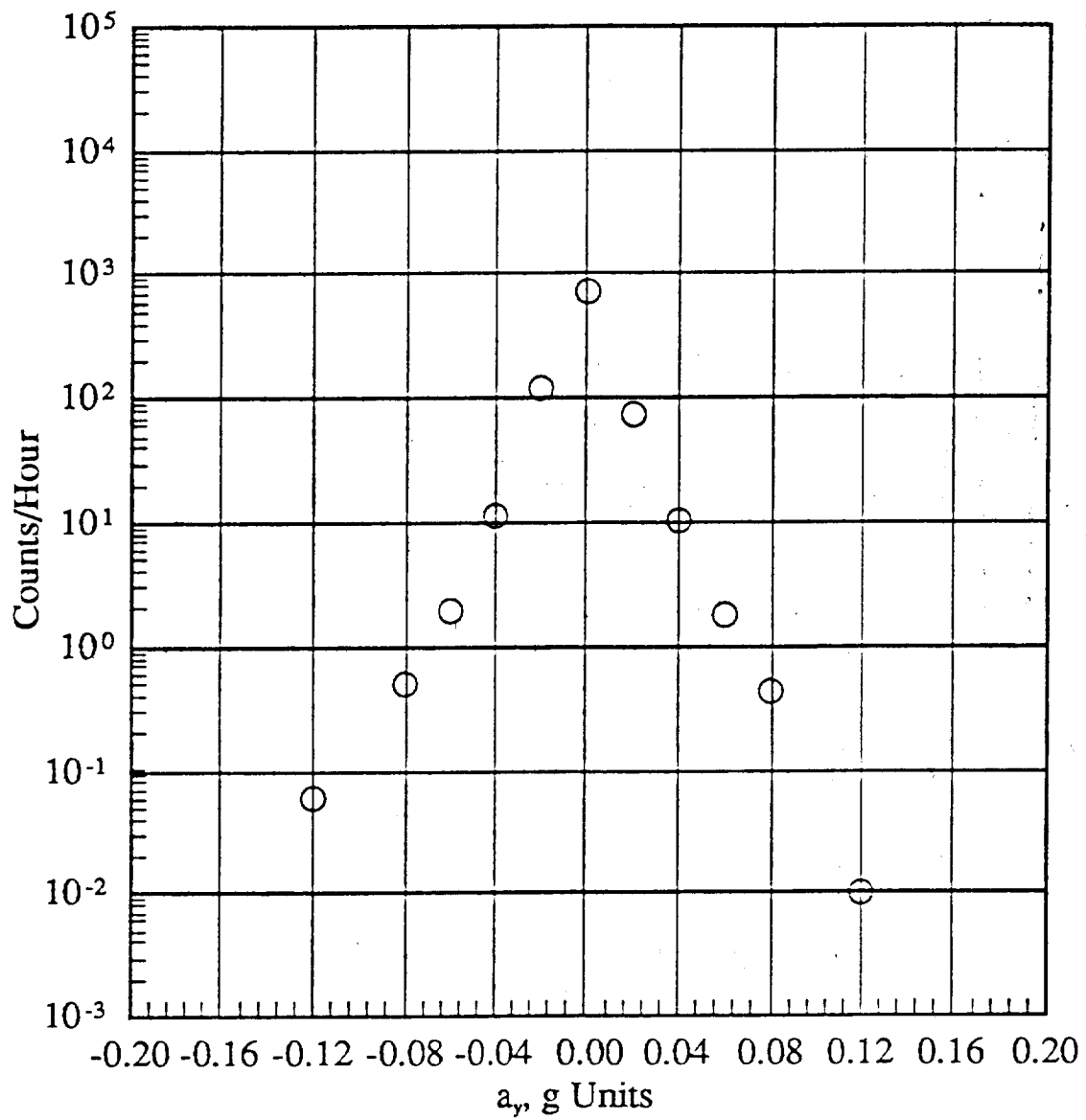
Total Flights	914
Total Hours	108.04
Total Miles	29500



(c) 4500 to 9500 feet altitude

Figure 14.- Continued.

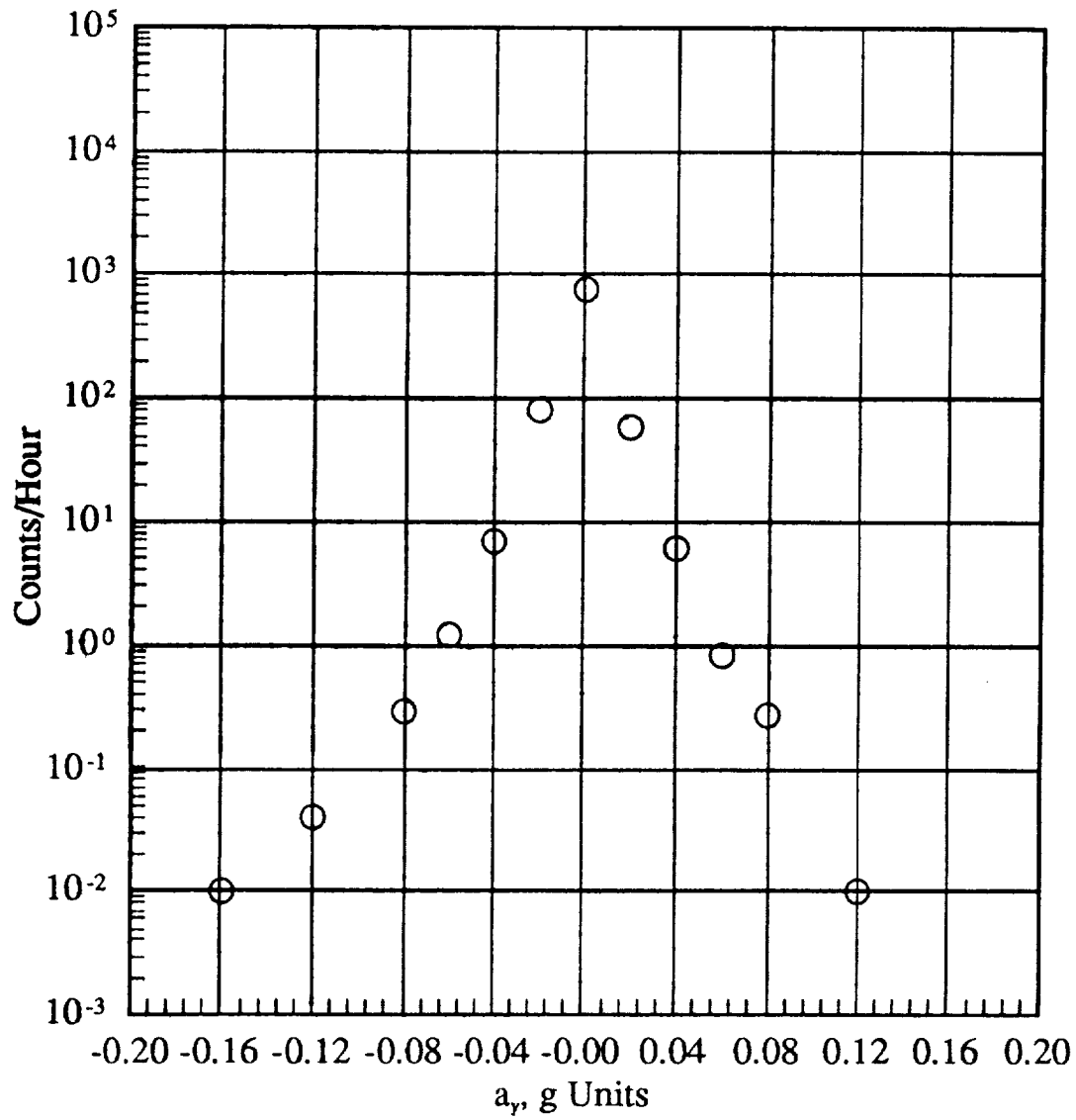
Total Flights	914
Total Hours	108.72
Total Miles	37758



(d) 9500 to 14500 feet altitude

Figure 14.- Continued.

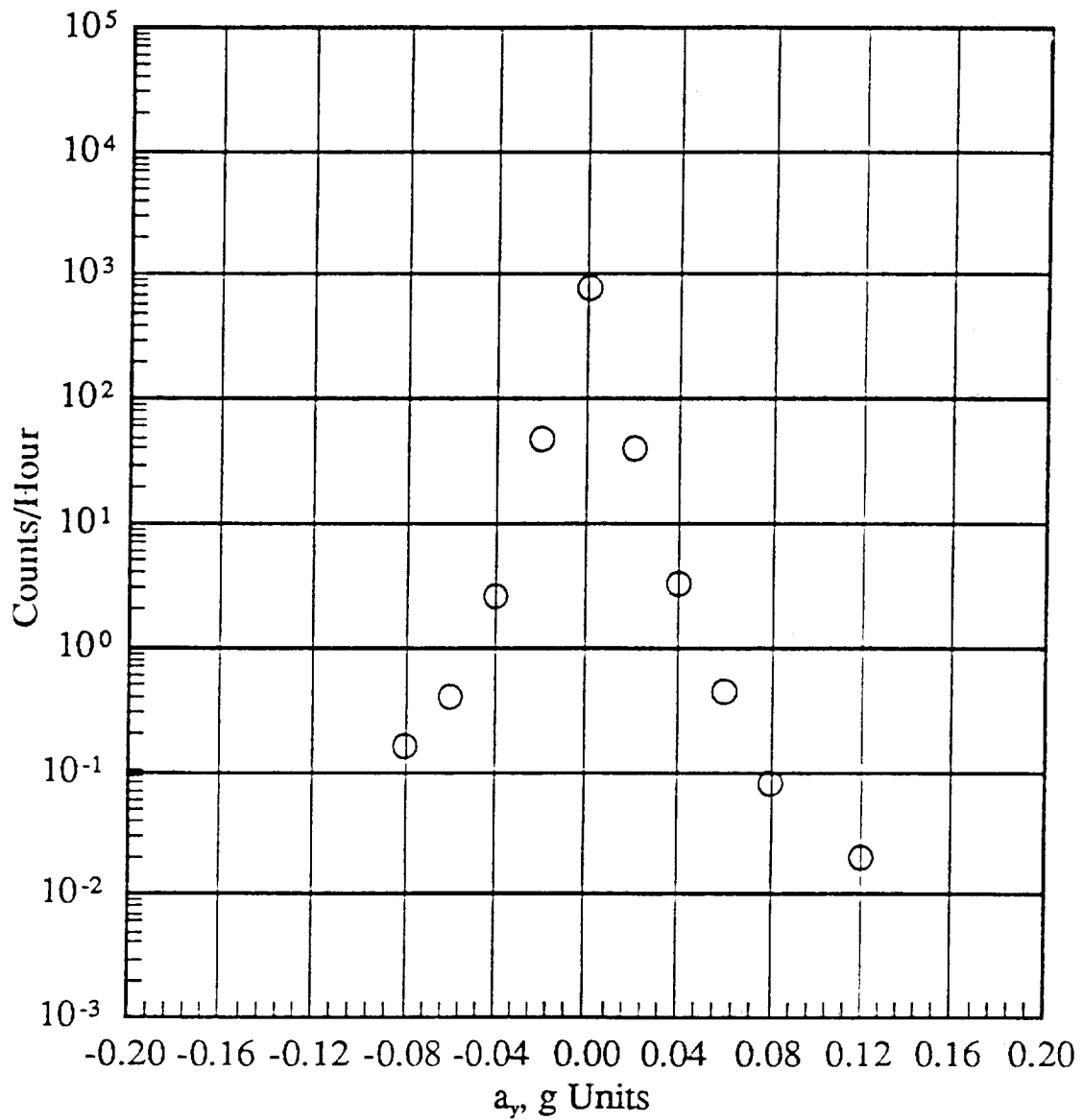
Total Flights	914
Total Hours	77.17
Total Miles	31446



(e) 14500 to 19500 feet altitude

Figure 14.- Continued.

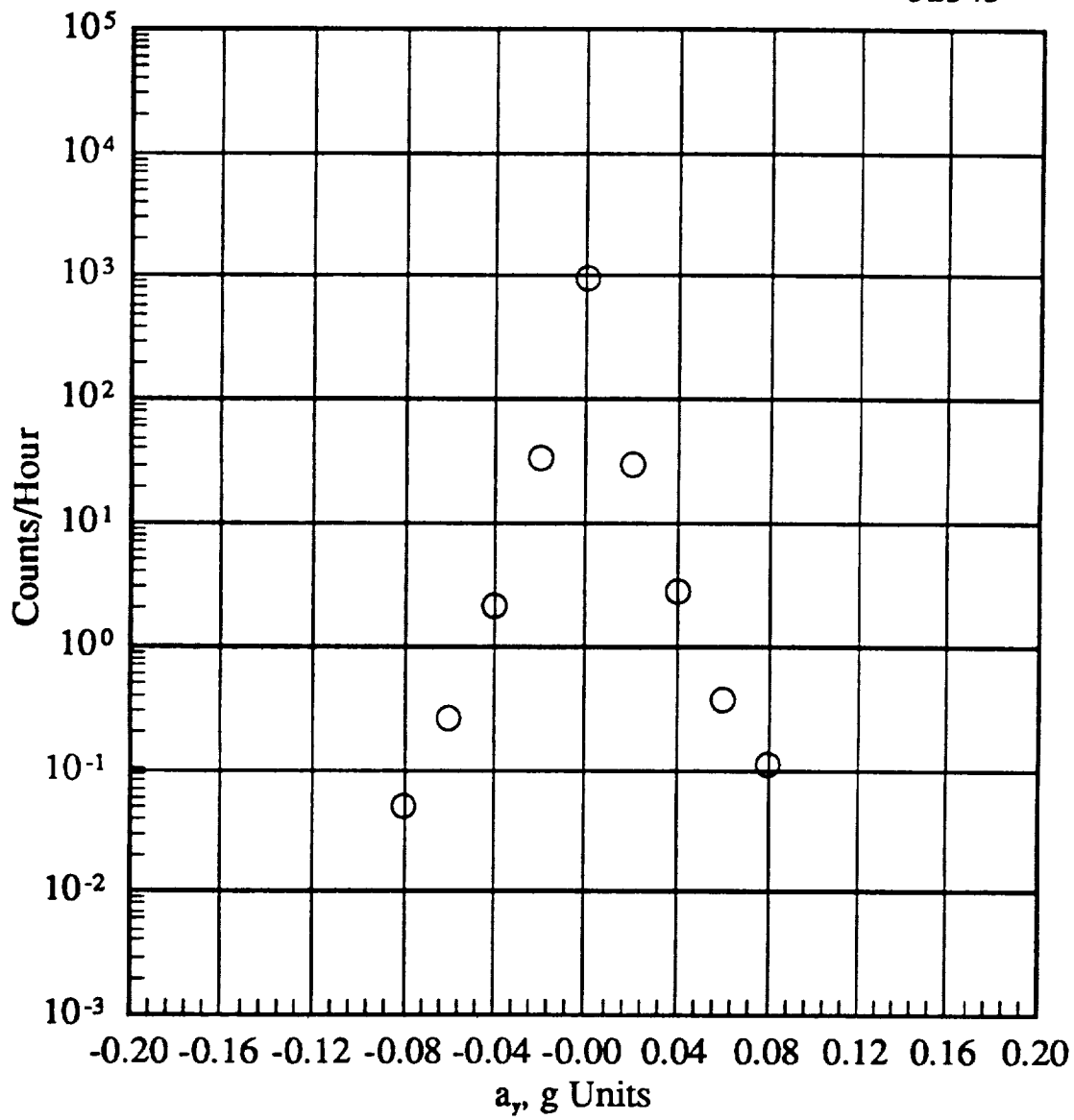
Total Flights	914
Total Hours	83.30
Total Miles	36597



(f) 19500 to 24500 feet altitude

Figure 14.- Continued.

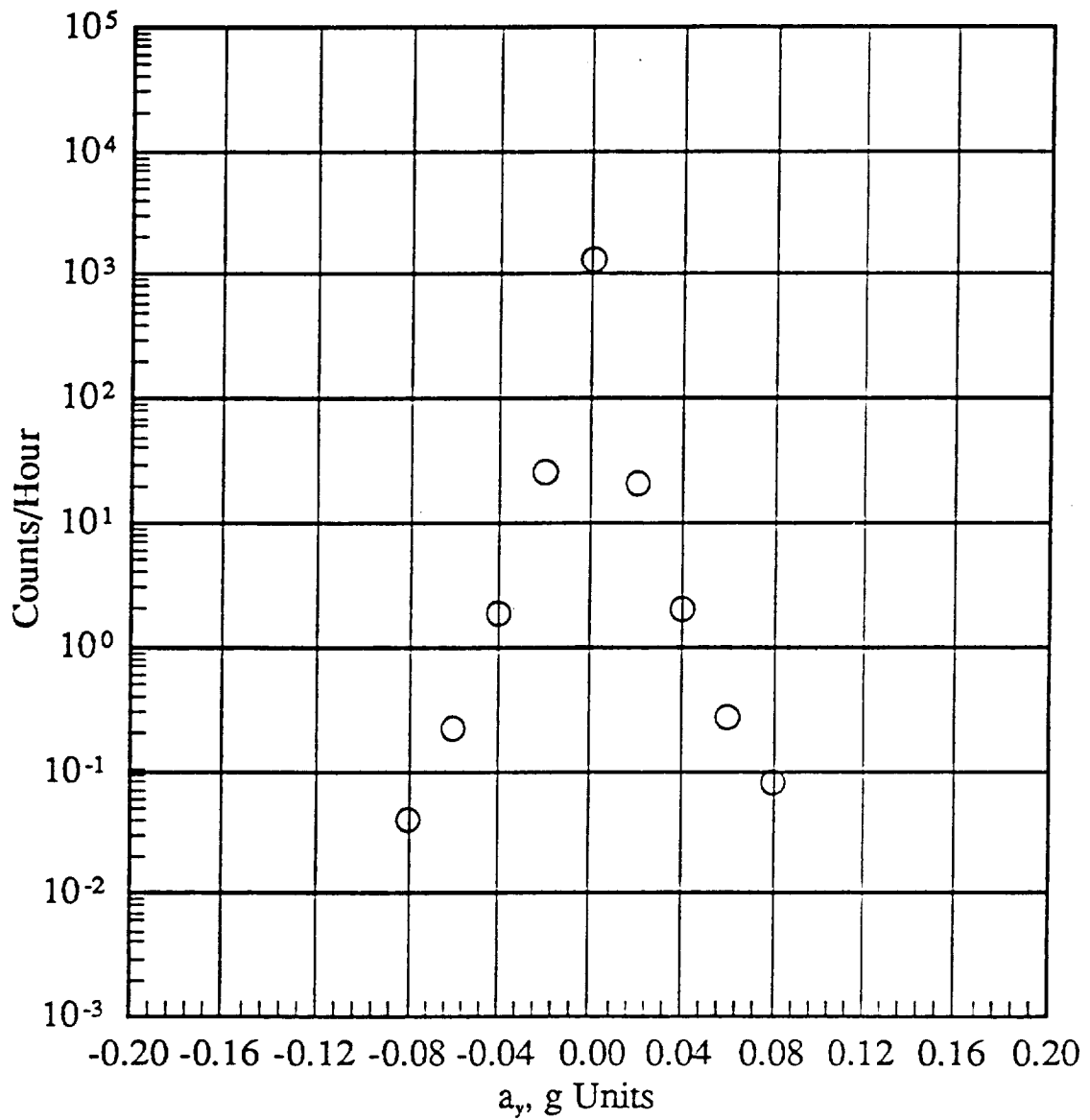
Total Flights	914
Total Hours	110.42
Total Miles	52345



(g) 24500 to 29500 feet altitude

Figure 14.- Continued.

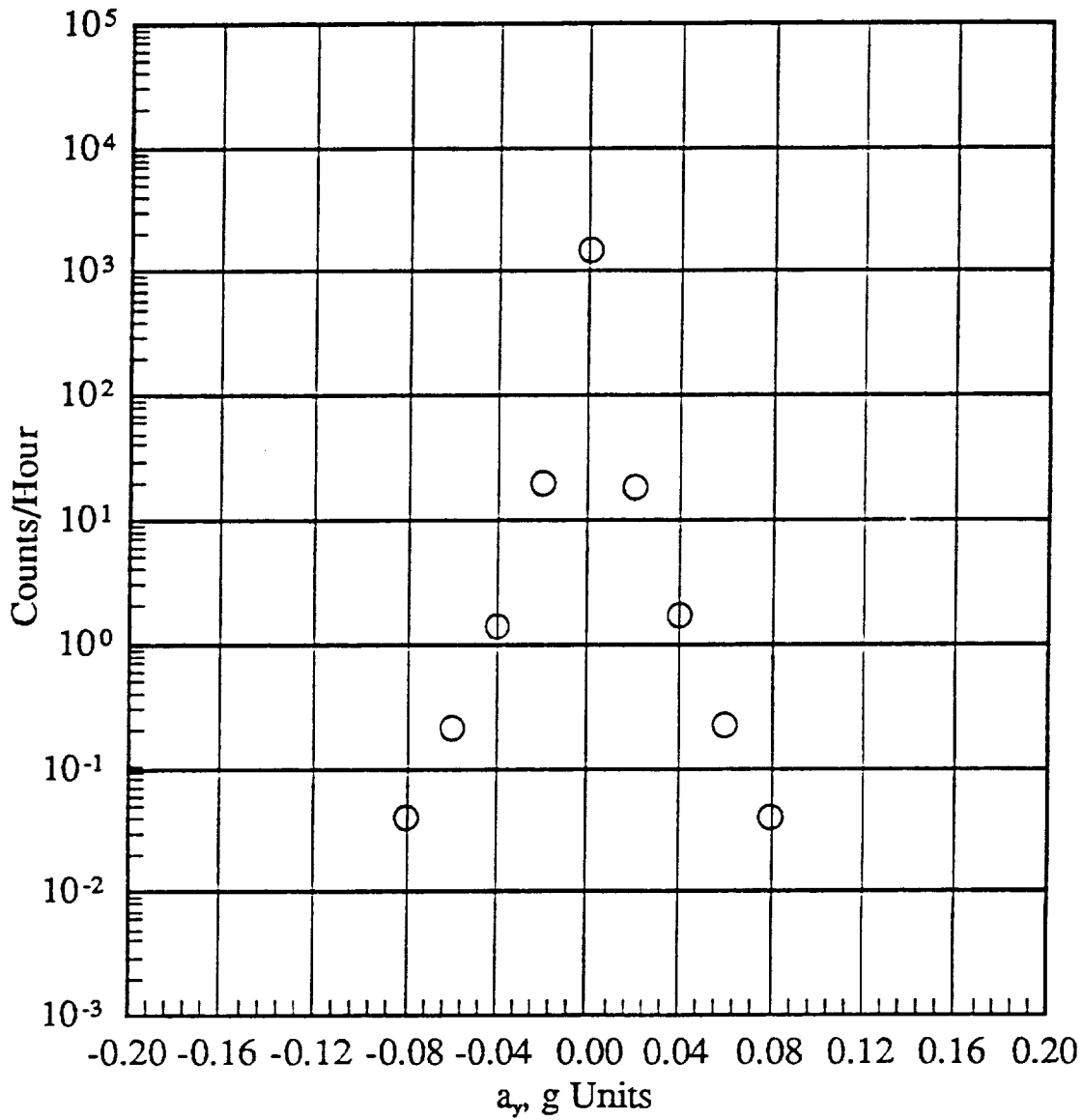
Total Flights	914
Total Hours	266.52
Total Miles	131370



(h) 29500 to 34500 feet altitude

Figure 14.- Continued.

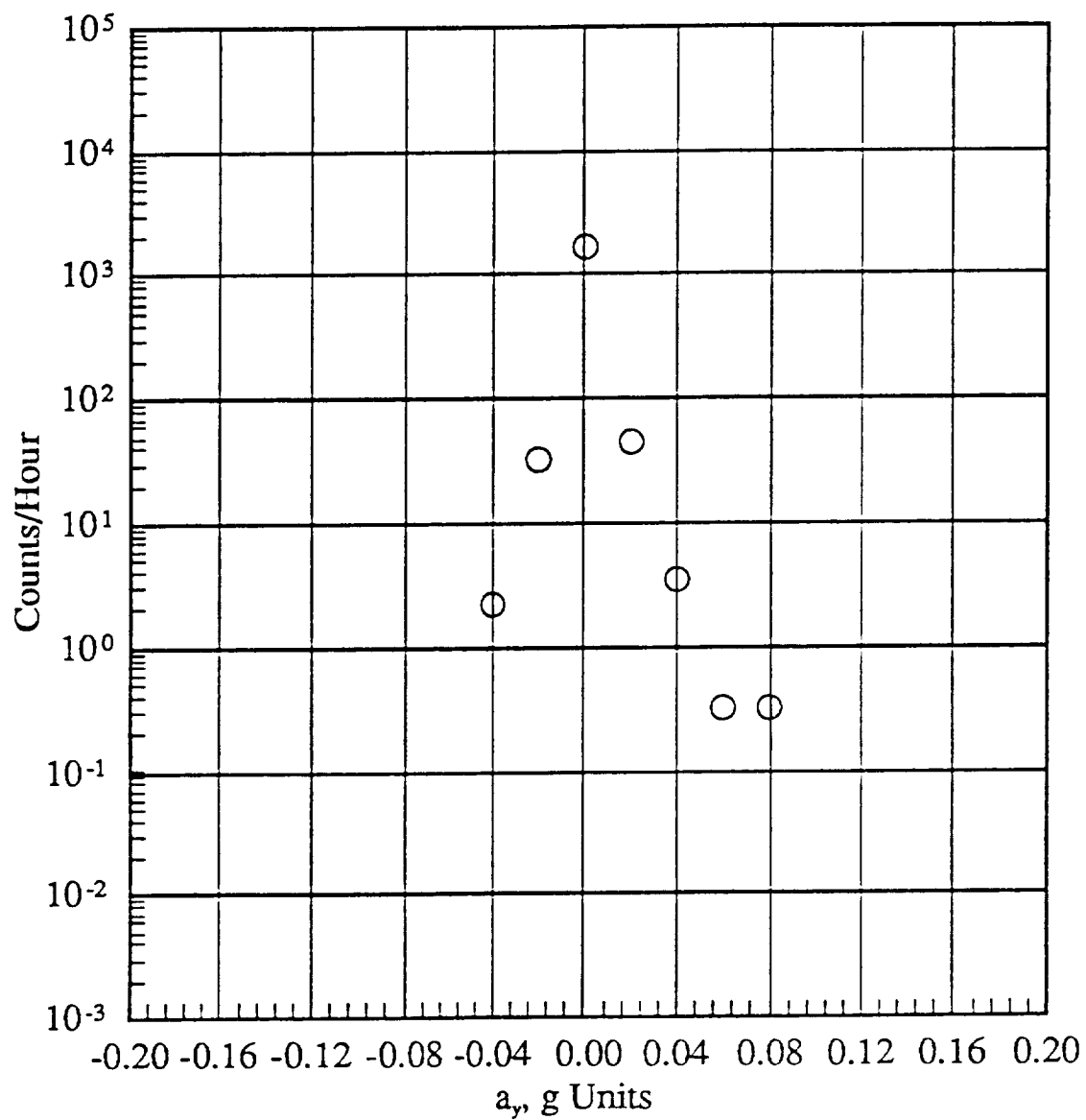
Total Flights	914
Total Hours	742.54
Total Miles	363809



(i) 34500 to 39500 feet altitude

Figure 14.- Continued.

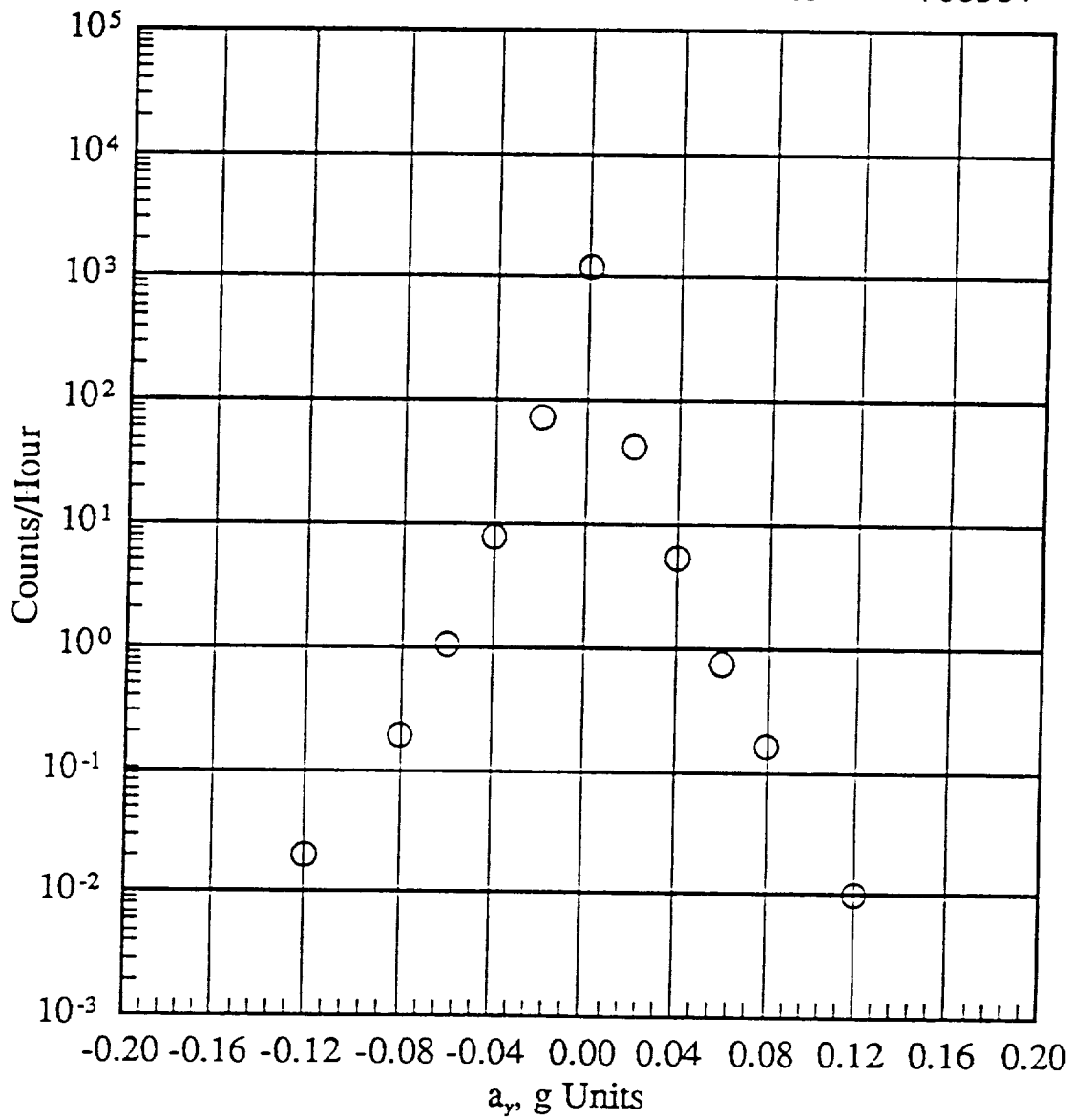
Total Flights	914
Total Hours	3.15
Total Miles	1545



(j) 39500 to 44500 feet altitude

Figure 14.- Continued.

Total Flights	914
Total Hours	1619.24
Total Miles	708384



(k) -500 to 44500 feet altitude

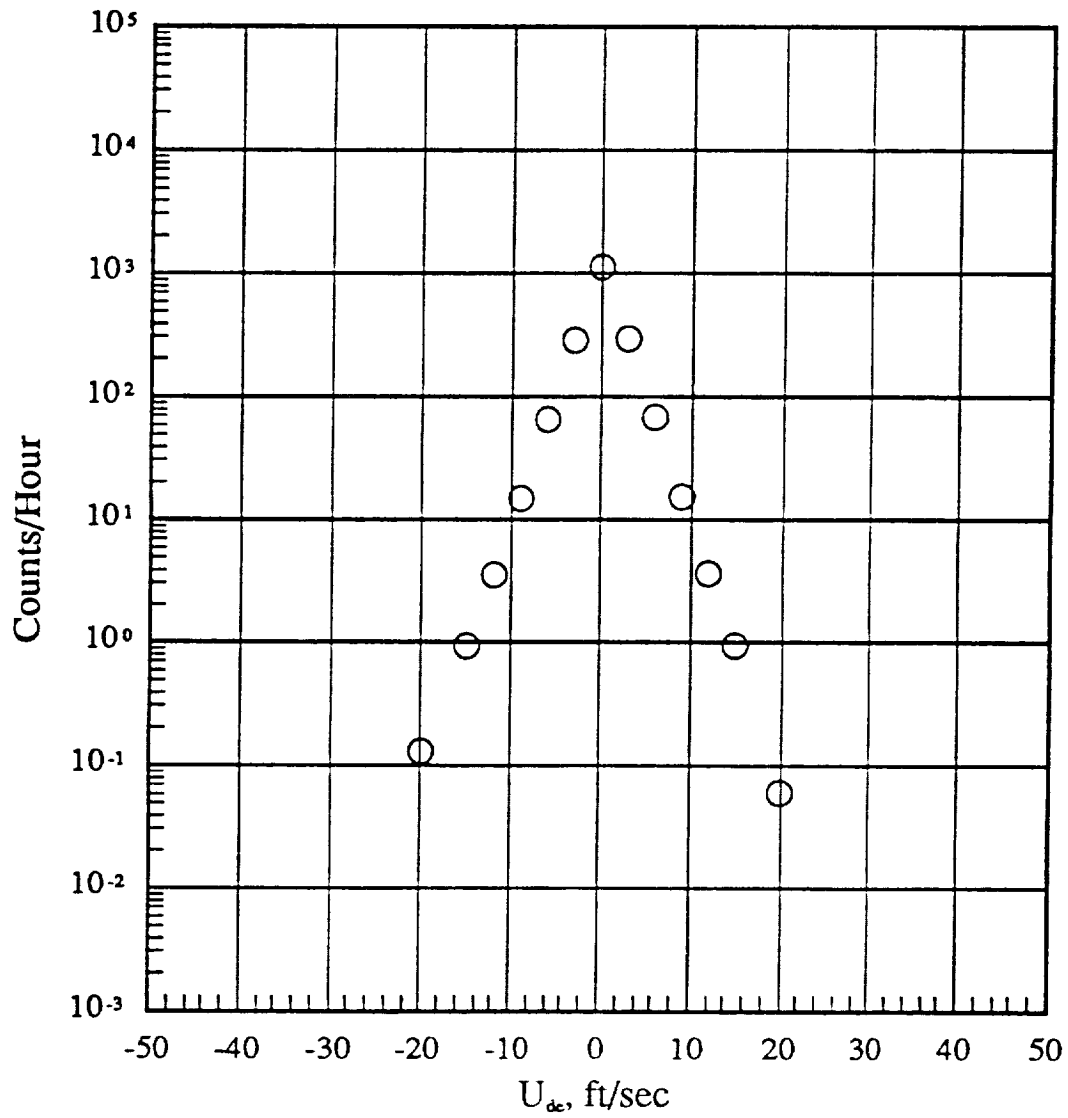
Figure 14.- Concluded.

DERIVED GUST VELOCITY LEVEL FT/SEC		PRESSURE ALTITUDE BANDS													
		-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	44500 TO 49500 FT	49500 TO 54500 FT	54500 TO 59500 FT	59500 TO 64500 FT	64500 TO 69500 FT
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0
30	0	0.01	0.02	0.02	0	0	0	0	0	0	0	0	0	0	0
20	0.06	0.10	0.06	0.06	0.03	0	0	0	0	0	0	0	0.02	0	0.02
15	0.94	0.41	0.29	0.13	0.13	0.01	0	0	0	0	0	0	0.12	0	0.12
12	3.64	1.12	0.56	0.26	0.26	0.04	0.01	0.03	0	0	0	0	0.40	0	0.40
9	15.31	3.41	1.64	0.71	0.71	0.11	0.04	0.09	0.02	0	0	0	1.53	0	1.53
6	67.82	13.76	7.06	2.73	0.71	0.38	0.40	0.21	0	0	0	0	6.75	0	6.75
3	294.80	71.46	38.04	18.43	8.18	5.41	4.93	4.30	1.59	0	0	0	33.51	0	33.51
0	1121.52	1205.66	1383.02	1505.45	1602.97	1623.82	1647.05	1651.64	1702.41	1702.41	1552.74	0	1552.74	0	1552.74
-3	286.81	72.53	38.67	19.37	8.34	5.30	4.78	4.14	1.90	0	0	0	32.98	0	32.98
-6	64.94	13.24	6.55	2.67	0.77	0.37	0.36	0.20	0	0	0	0	6.45	0	6.45
-9	14.83	3.46	1.89	0.67	0.14	0.06	0.06	0.03	0	0	0	0	1.52	0	1.52
-12	3.55	1.21	0.57	0.17	0.04	0	0.02	0.01	0	0	0	0	0.40	0	0.40
-15	0.93	0.51	0.24	0.08	0	0	0.01	0	0	0	0	0	0.12	0	0.12
-20	0.13	0.11	0.06	0.01	0	0	0.01	0	0	0	0	0	0.02	0	0.02
-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT	119.38	108.04	108.72	77.17	83.30	110.42	266.52	742.54	3.15	1619.24	0	0	1619.24	0	0
FLIGHT MILES @ ALT	24014.89	29500.10	37757.93	31445.86	36596.70	52344.52	131369.92	363808.53	1545.14	708383.60	0	0	708383.60	0	0
TOTAL FLIGHTS															914
TOTAL FLIGHT HOURS FLAPS UP AND DOWN															1619.24
TOTAL FLIGHT MILES FLAPS UP AND DOWN															708383.60

(a)  $U_{de}$  Level crossing counts per hour within pressure altitude bands.

Figure 15.-  $U_{de}$  Exceedances

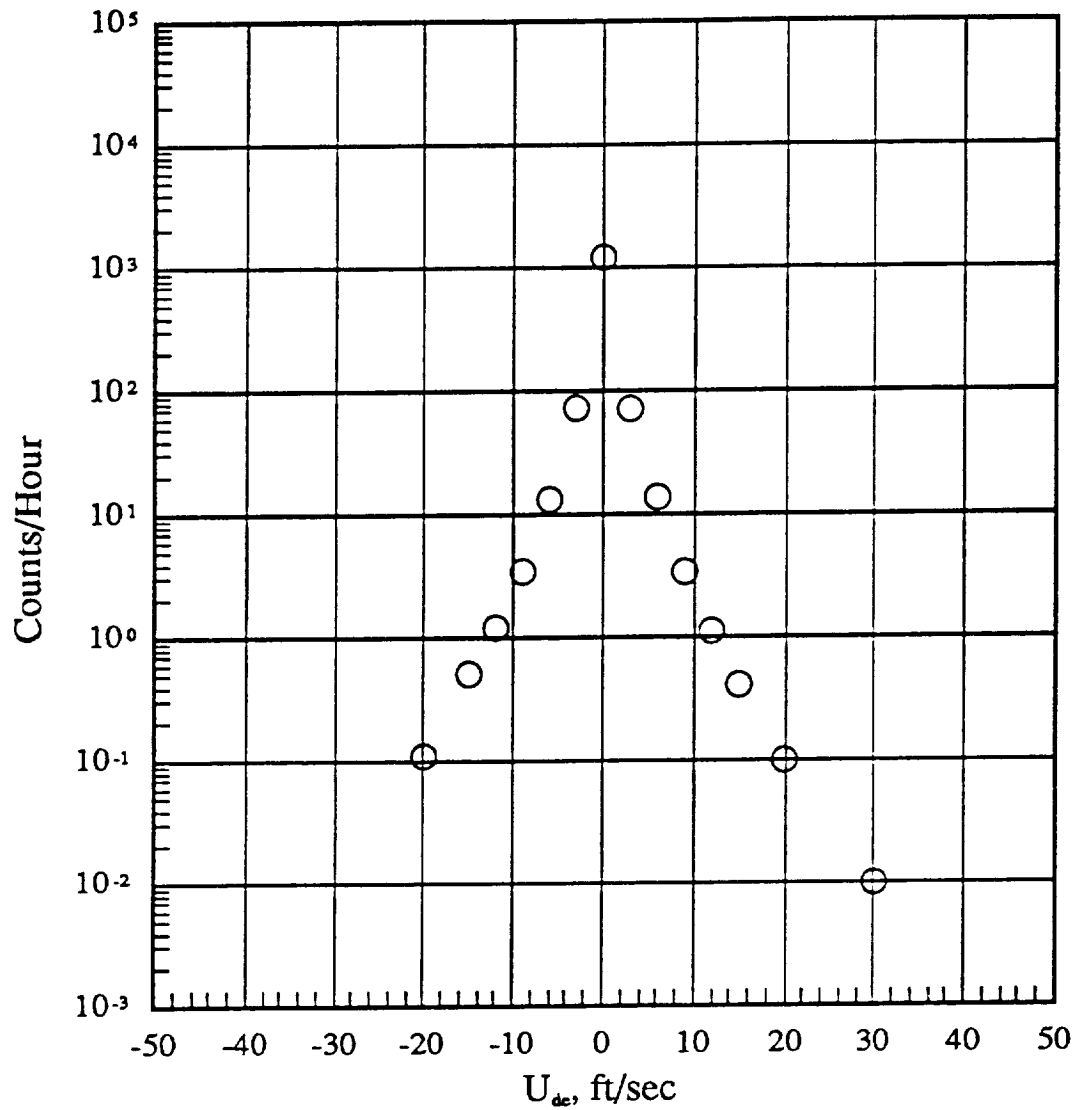
Total Flights	914
Total Hours	119.88
Total Miles	24015



(b) -500 to 4500 feet altitude

Figure 15.- Continued.

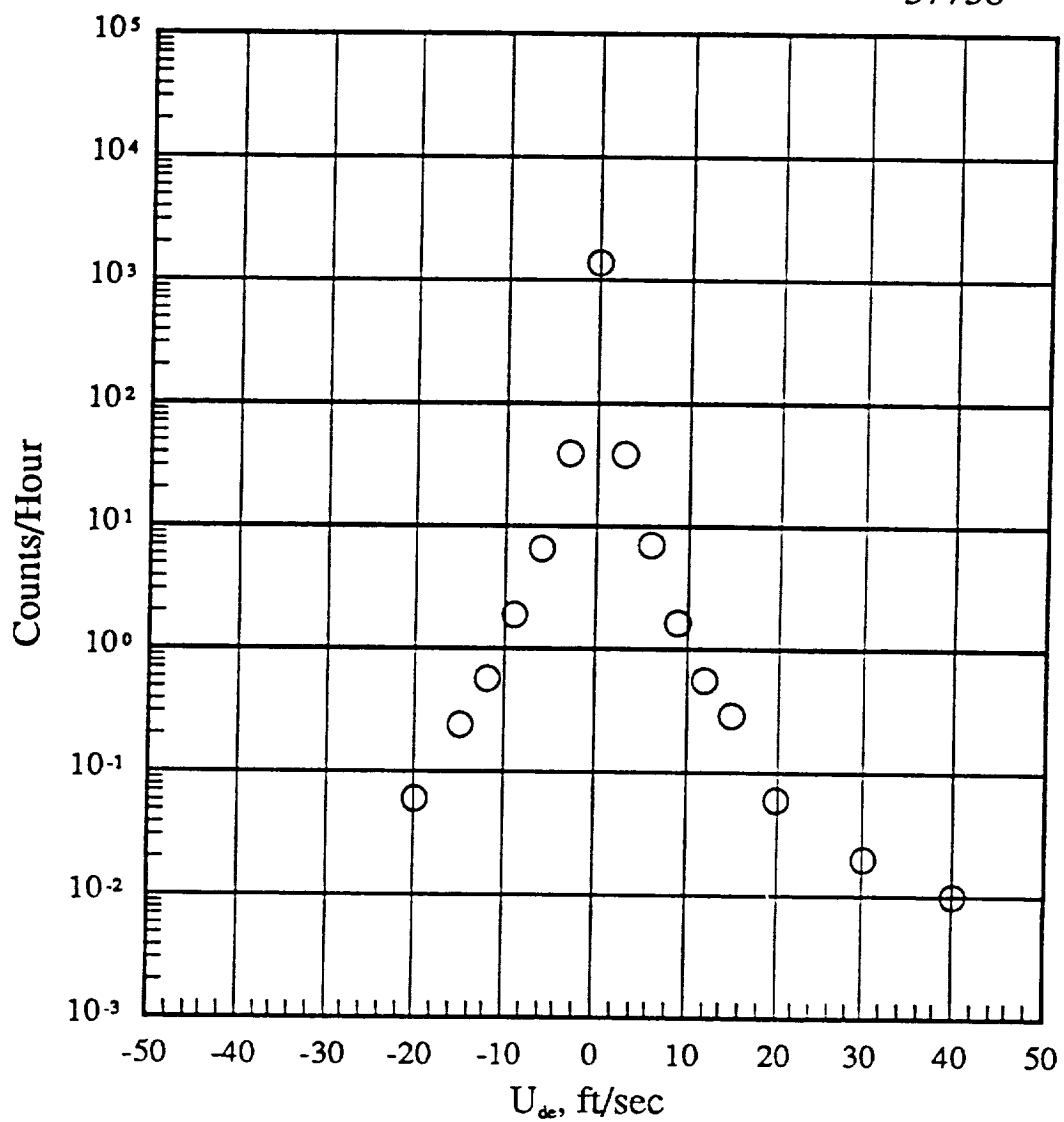
Total Flights	914
Total Hours	108.04
Total Miles	29500



(c) 4500 to 9500 feet altitude

Figure 15.- Continued.

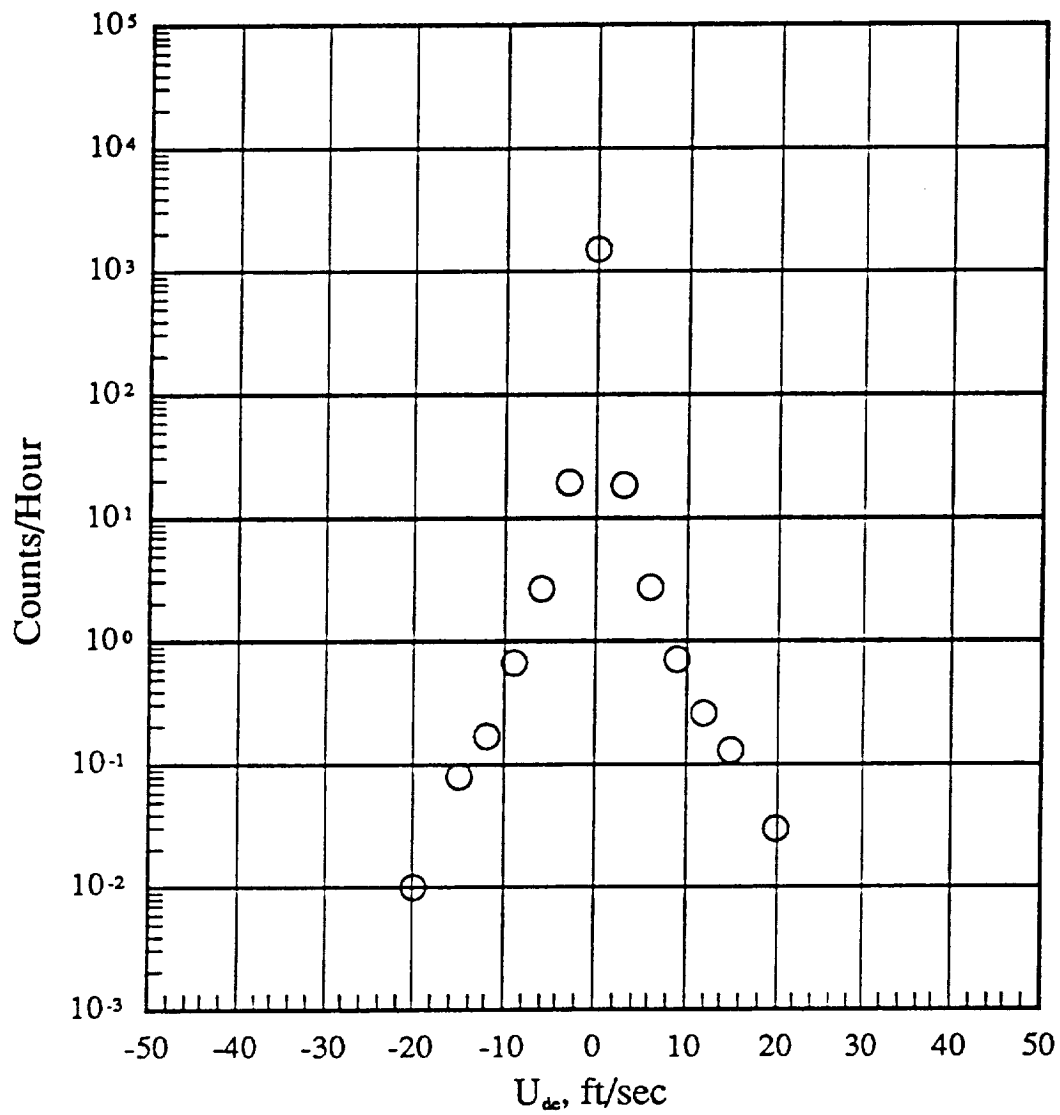
Total Flights	914
Total Hours	108.72
Total Miles	37758



(d) 9500 to 14500 feet altitude

Figure 15.- Continued.

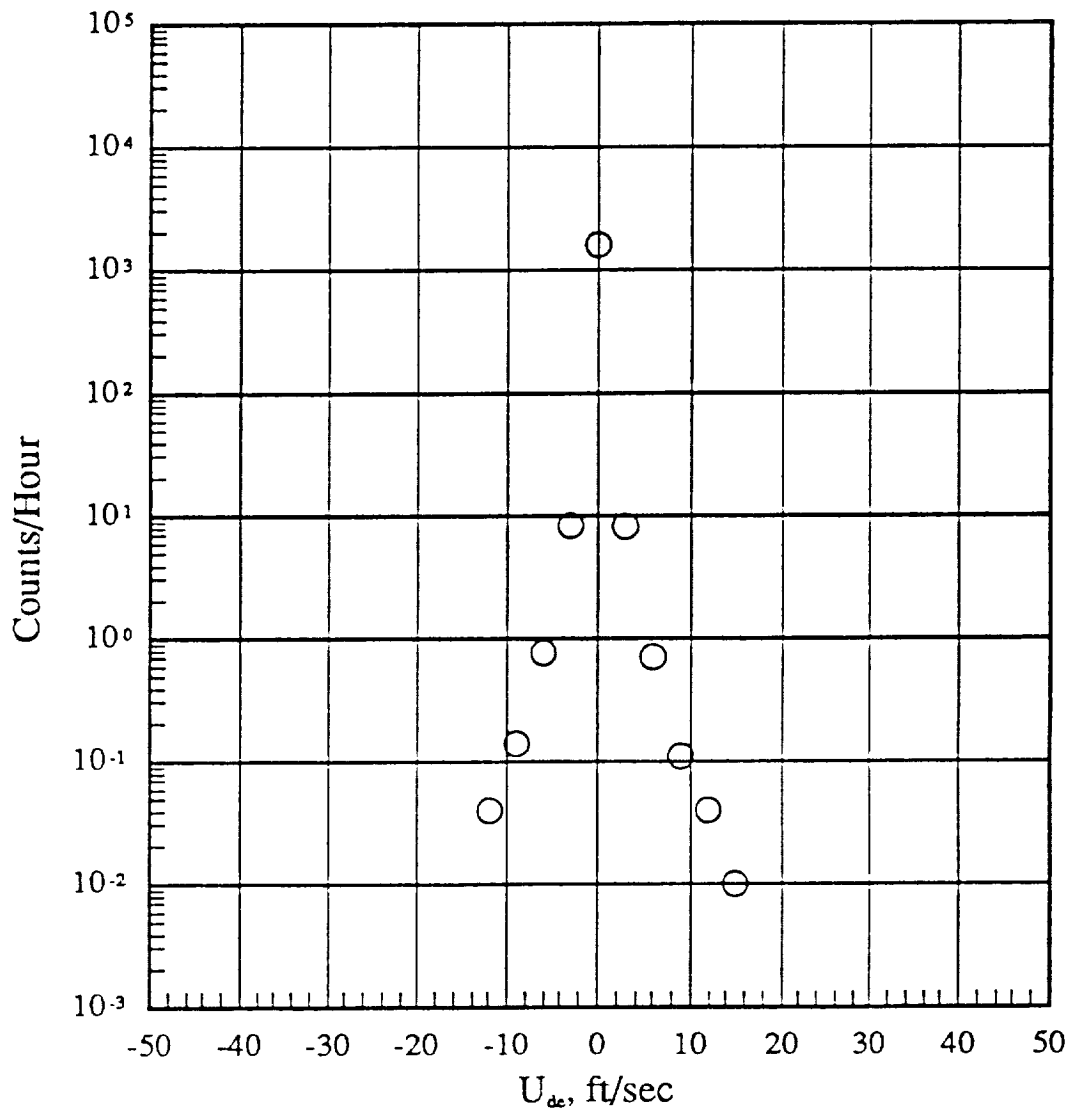
Total Flights	914
Total Hours	77.17
Total Miles	31445



(e) 14500 to 19500 feet altitude

Figure 15.- Continued.

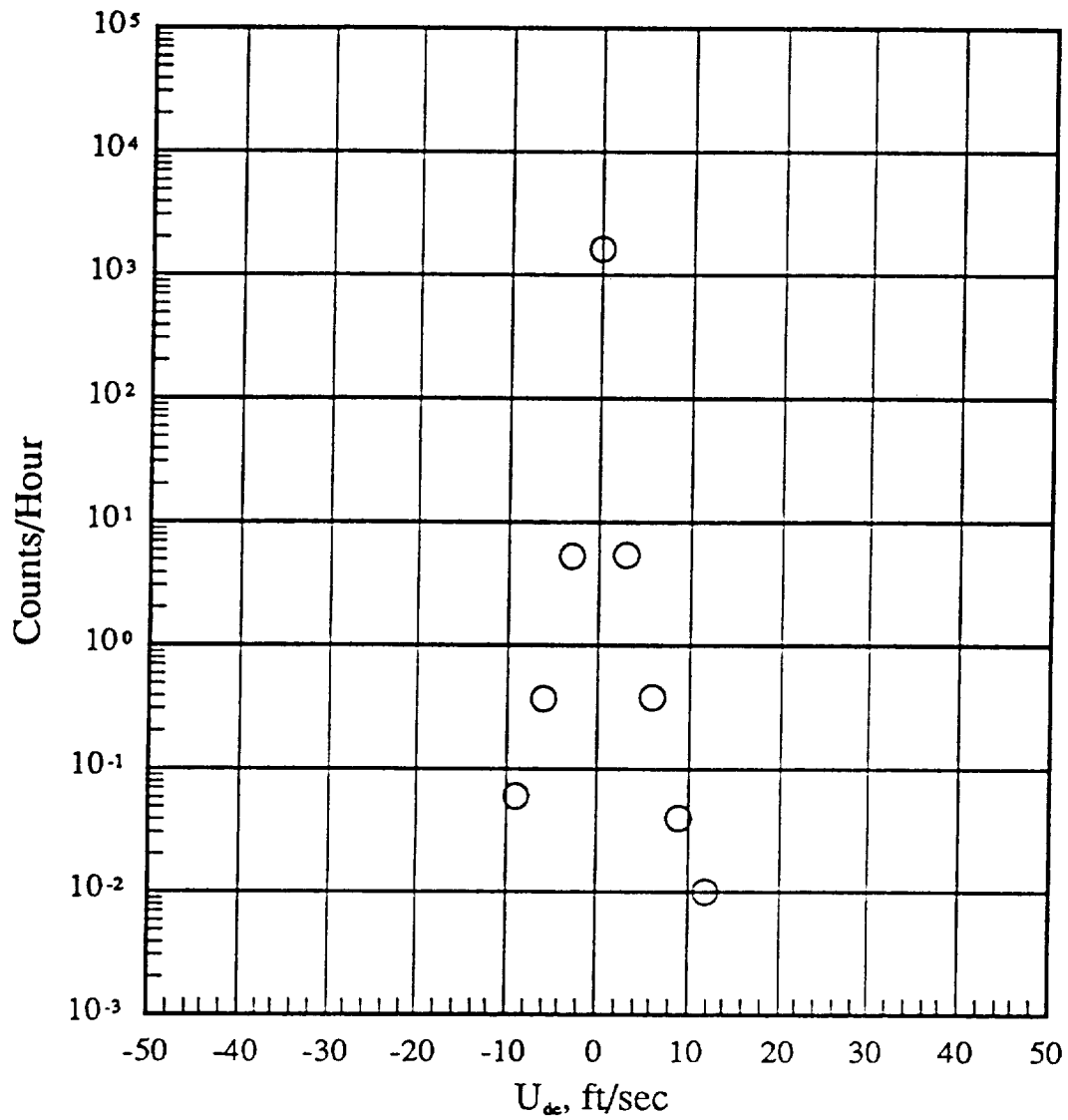
Total Flights 914  
Total Hours 83.30  
Total Miles 36597



(f) 19500 to 24500 feet altitude

Figure 15.- Continued.

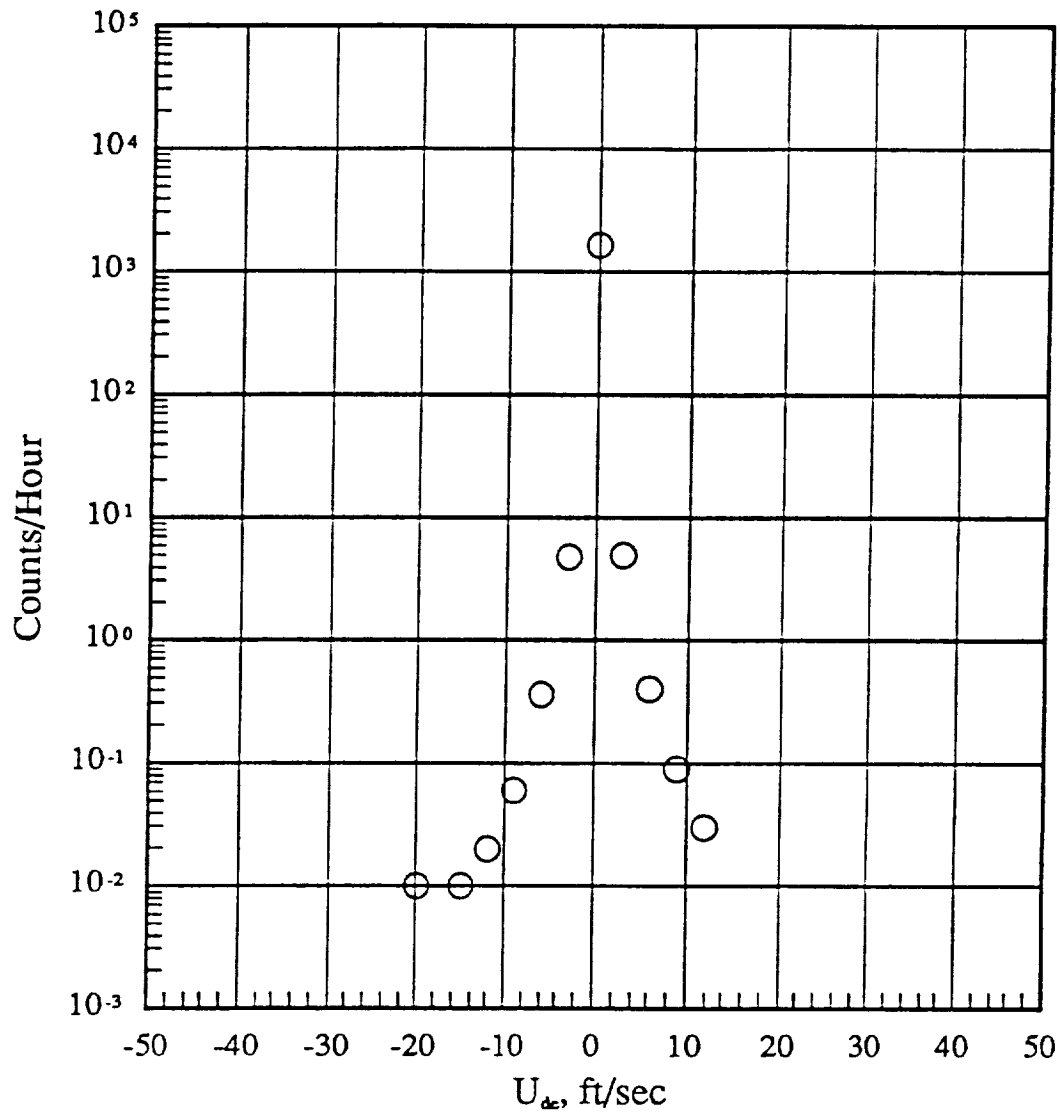
Total Flights	914
Total Hours	110.42
Total Miles	52345



(g) 24500 to 29500 feet altitude

Figure 15.- Continued.

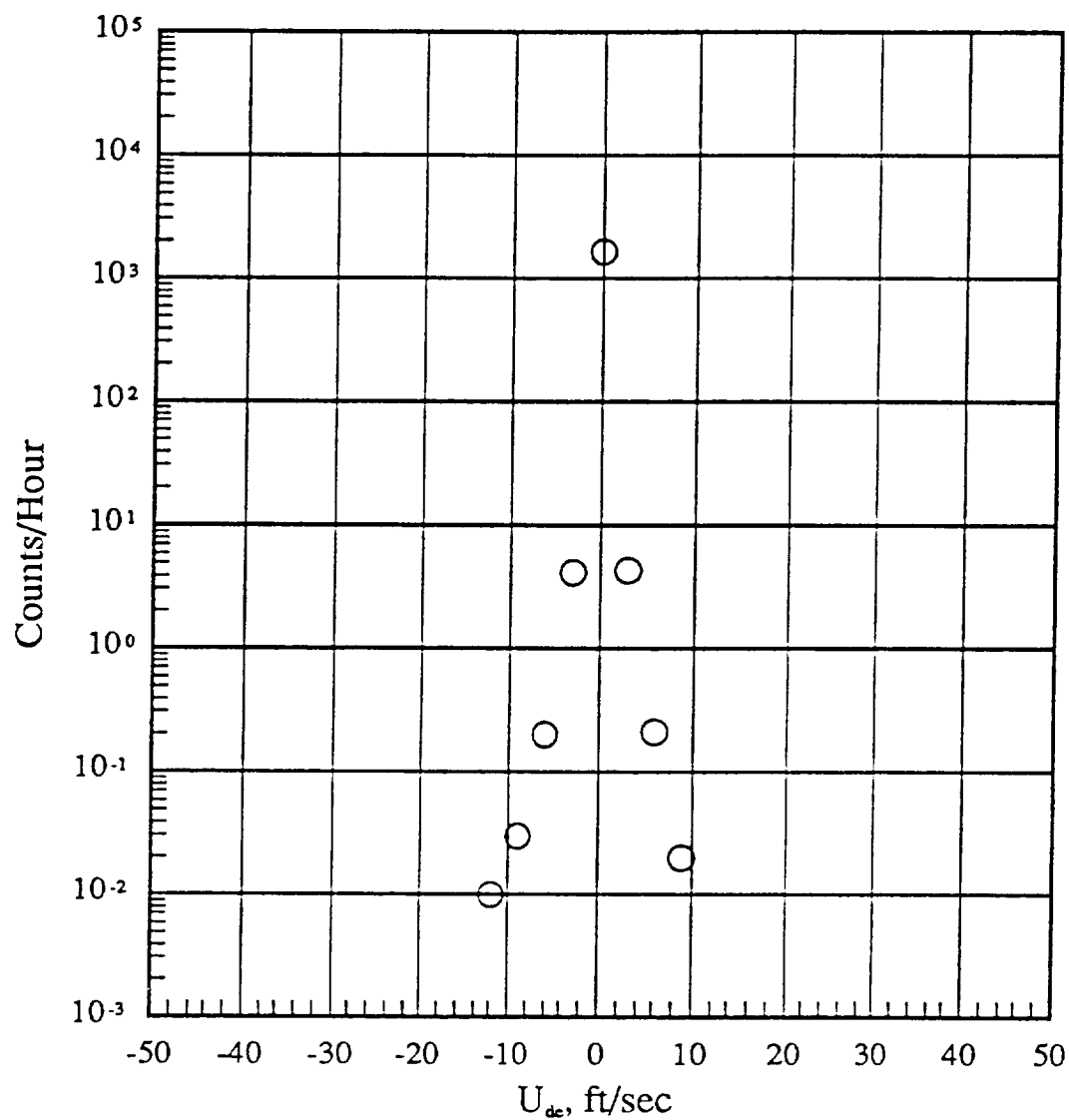
Total Flights	914
Total Hours	266.52
Total Miles	131370



(h) 29500 to 34500 feet altitude

Figure 15.- Continued.

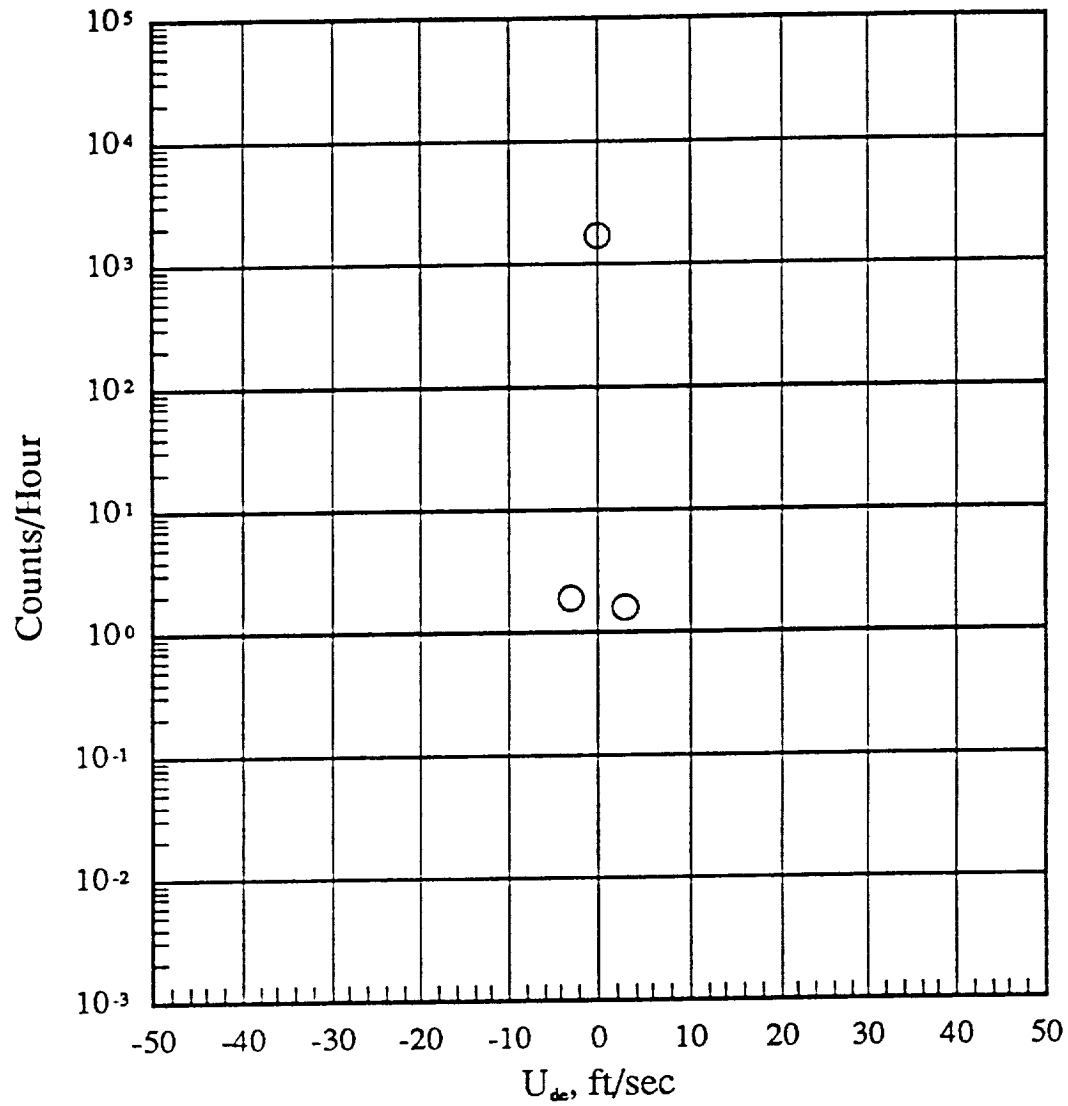
Total Flights	914
Total Hours	742.54
Total Miles	363809



(i) 34500 to 39500 feet altitude

Figure 15.- Continued.

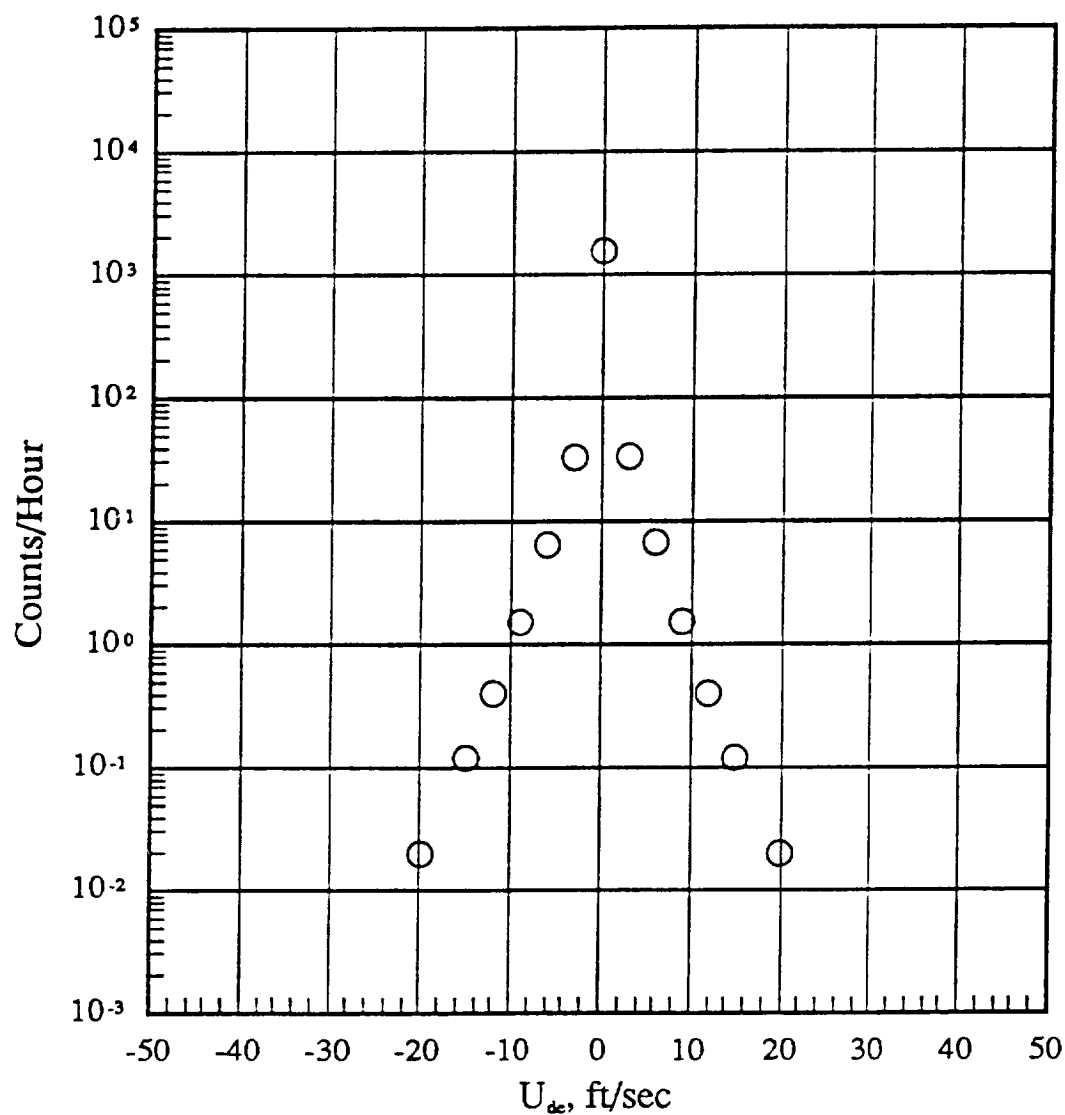
Total Flights	914
Total Hours	3.15
Total Miles	1545



(j) 39500 to 44500 feet altitude

Figure 15.- Continued.

Total Flights 914  
 Total Hours 1619.24  
 Total Miles 708384



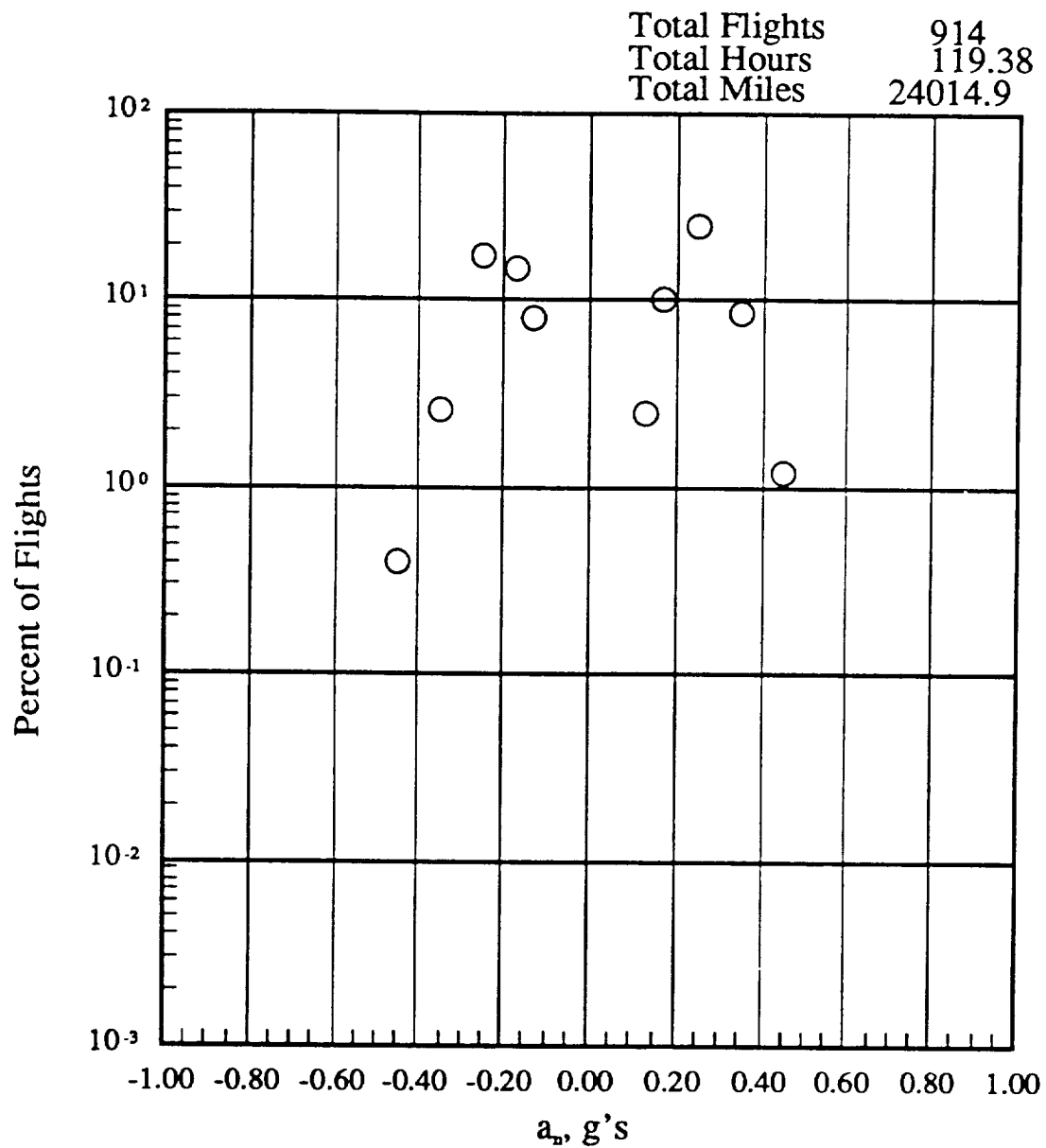
(k) -500 to 44500 feet altitude

Figure 15.- Concluded

MAXIMUM $a_n$		-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
LEVEL FOR EACH FLIGHT											
$g's$ FROM											
TO											
1.60	1.80	0	0	0	0	0	0	0	0	0	0
1.40	1.60	0	0	0	0	0	0	0	0	0	0
1.20	1.40	0	0	0	0	0	0	0	0	0	0
1.00	1.20	0	0	0	0	0	0	0	0	0	0
.80	1.00	0	0.1	0.1	0	0	0	0	0	0	0.2
.70	0.80	0	0.1	0	0	0	0	0	0	0	0.1
.60	0.70	0	0.2	0	0.1	0	0	0.1	0	0	0.4
.50	0.60	0	0.2	0.4	0.2	0	0	0.2	0	0	1.1
.40	0.50	1.2	1.3	0.9	0.2	0.1	0.1	0.3	0.2	0	4.4
.30	0.40	8.6	4.0	2.1	1.4	0.7	0.1	0.2	0.8	0	17.9
.20	0.30	25.1	11.9	5.6	2.5	0.8	1.1	1.3	3.6	0	51.9
.15	0.20	10.2	4.0	1.8	1.0	0.2	0.2	0.9	0.9	0	19.1
.10	0.15	2.5	1.4	0.5	0.1	0	0.1	0.1	0	0	4.8
.05	0.10	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
-.05	-0.10	0	0	0	0	0	0	0	0	0	0
-1.0	-0.15	8.1	3.5	2.1	0.7	0.7	0.2	0.3	1.2	0	16.7
-1.5	-0.20	14.9	5.9	3.6	1.4	0.7	0.8	0.9	2.0	0	30.1
-2.0	-0.30	17.4	6.5	5.9	2.5	1.2	1.6	2.3	3.4	0	40.8
-3.0	-0.40	2.6	1.9	1.9	0.8	0	0.1	0.9	0.5	0	8.6
-4.0	-0.50	0.4	0.7	0.4	0.1	0.2	0	0.1	0.3	0	2.3
-5.0	-0.60	0	0.2	0.3	0.2	0	0	0	0	0	0.8
-6.0	-0.70	0	0.2	0	0.1	0	0	0	0.1	0	0.4
-7.0	-0.80	0	0.1	0	0	0	0	0	0	0	0.1
-8.0	-1.00	0	0	0	0	0	0	0.1	0	0	0.1
-1.00	-1.20	0	0	0	0	0	0	0	0	0	0
-1.20	-1.40	0	0	0	0	0	0	0	0	0	0
-1.40	-1.60	0	0	0	0	0	0	0	0	0	0
-1.60	-1.80	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT		119.38	108.04	108.72	77.17	83.30	110.42	266.52	742.54	3.15	1619.24
FLIGHT MILES @ ALT		24014.89	29500.10	37757.94	31445.86	36596.71	52344.5	131369.93	363808.56	1545.14	708383.64
TOTAL FLIGHTS											914

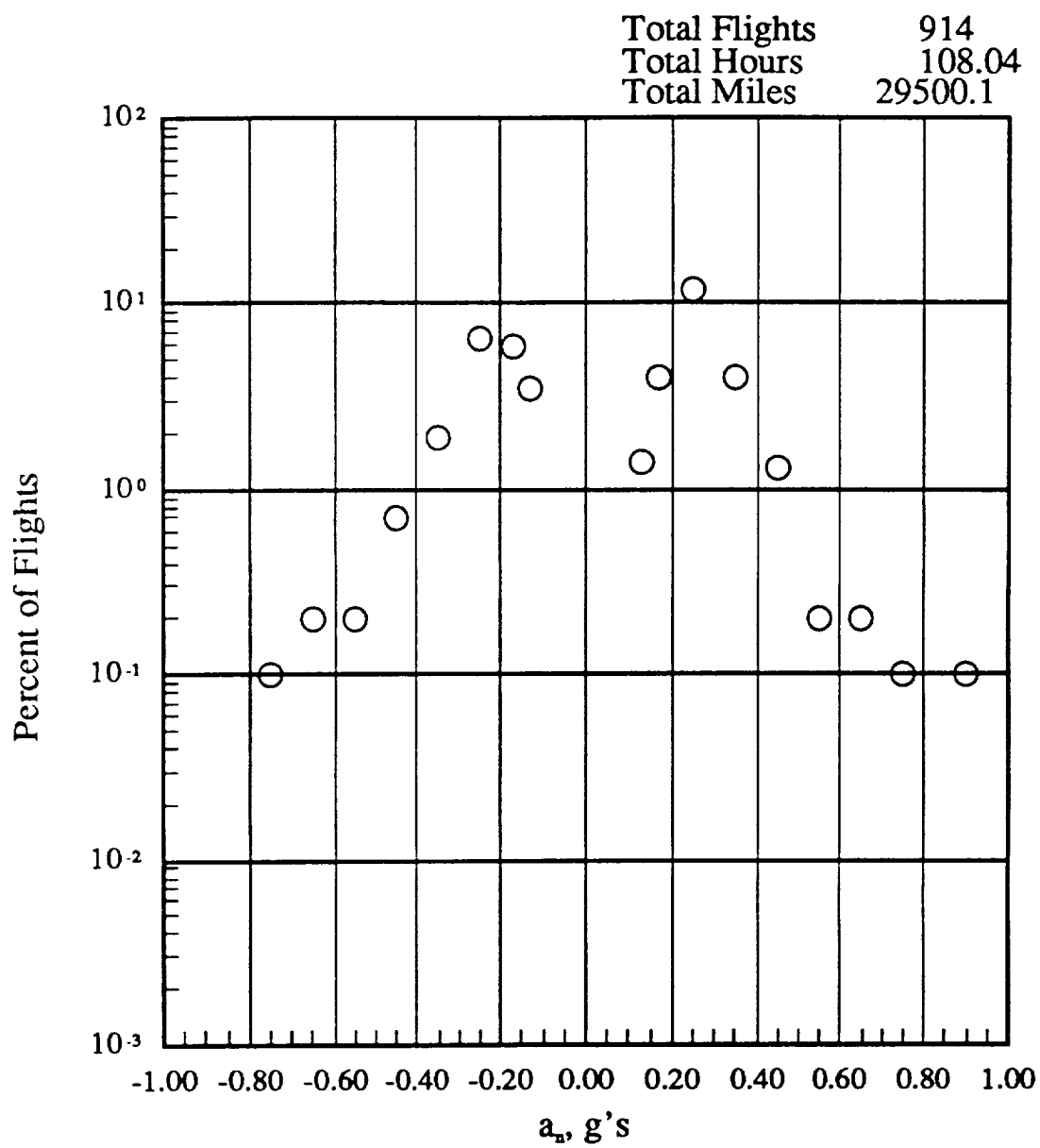
(a) Percent of flights where peak positive and negative  $a_n$  per flight occurs within pressure altitude bands, any flap

Figure 16.- Peak positive and negative  $a_n$  vs altitude.



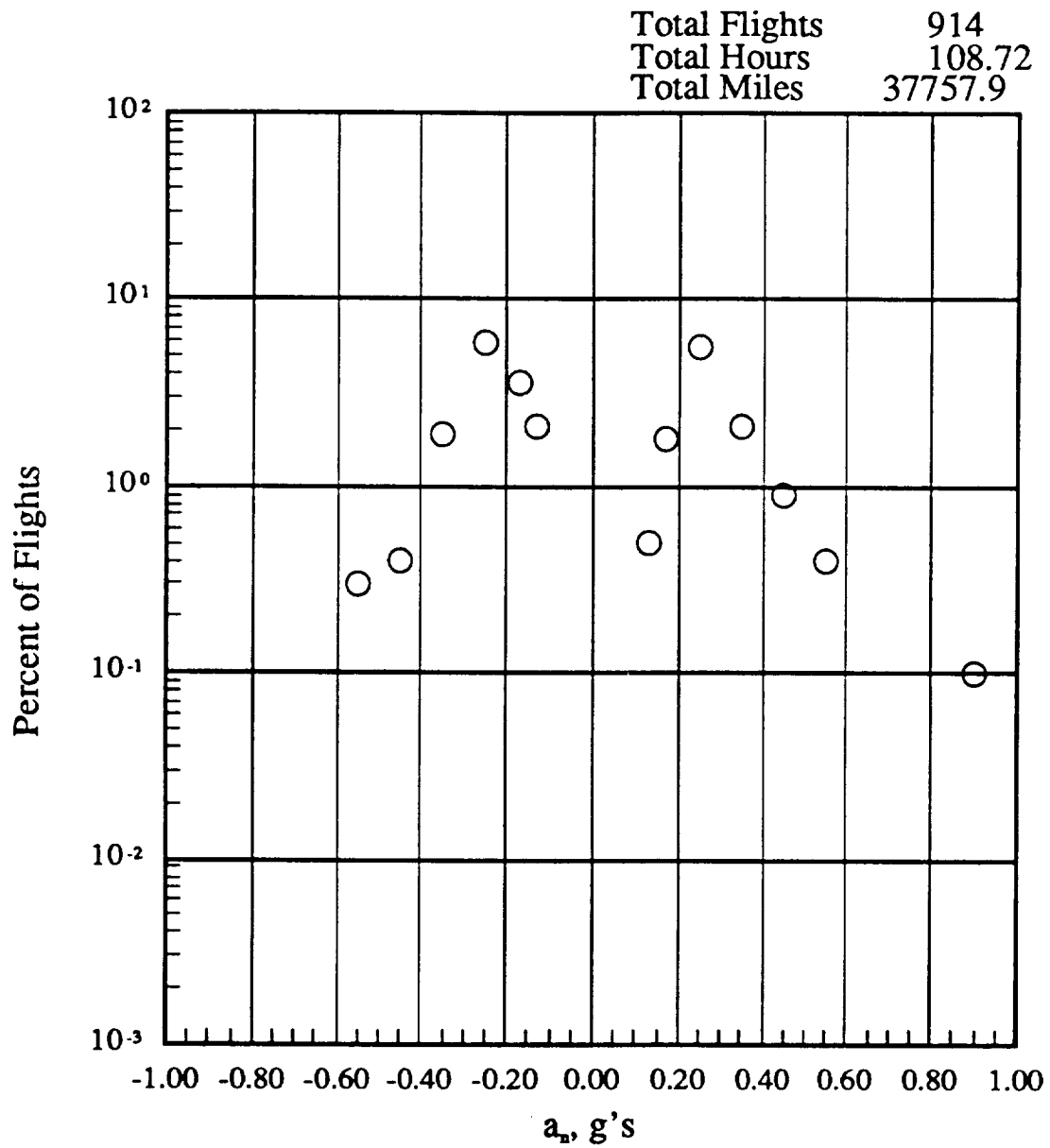
(b) -500 to 4500 feet altitude

Figure 16.- Continued.



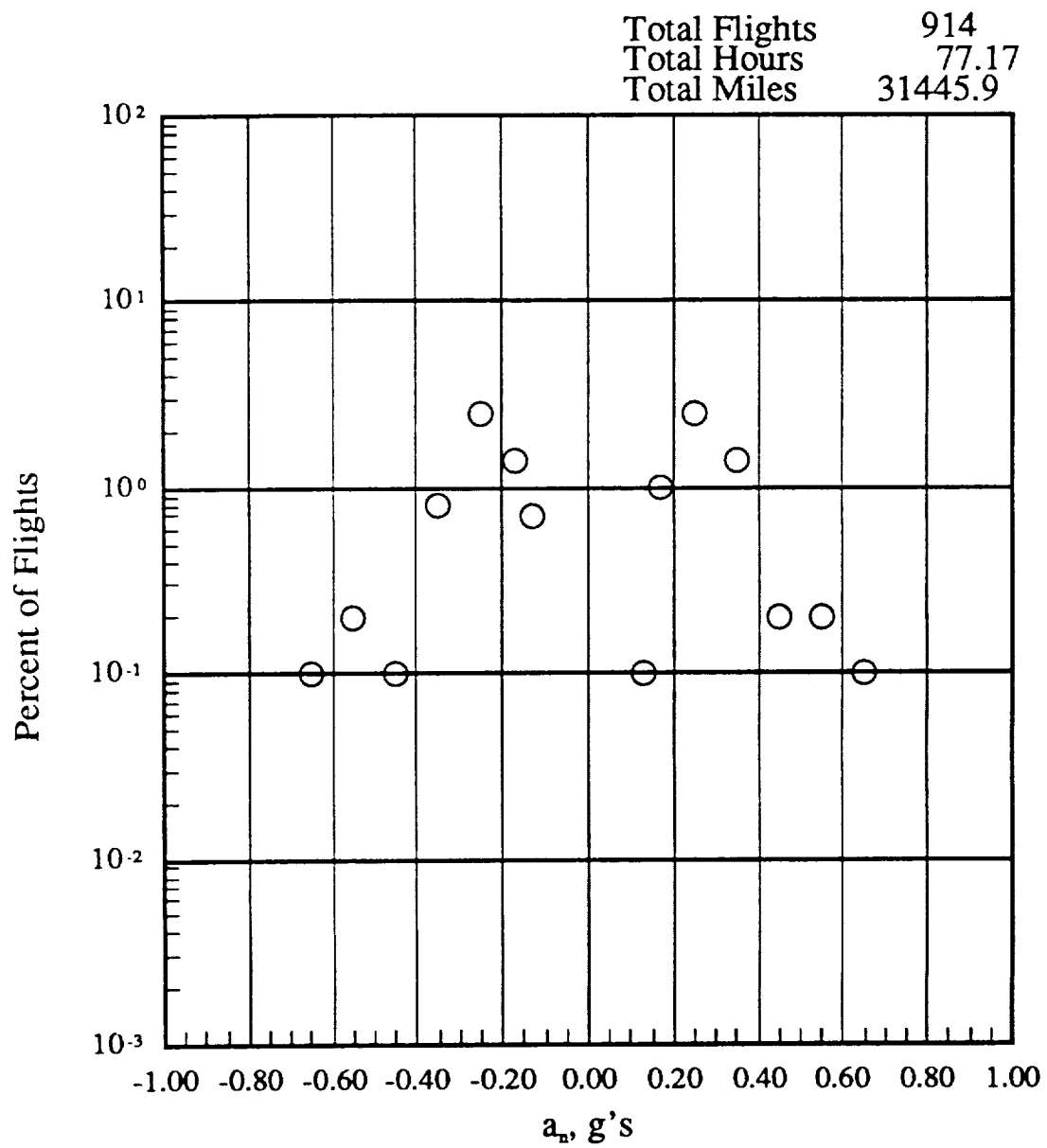
(c) 4500 to 9500 feet altitude

Figure 16.- Continued.



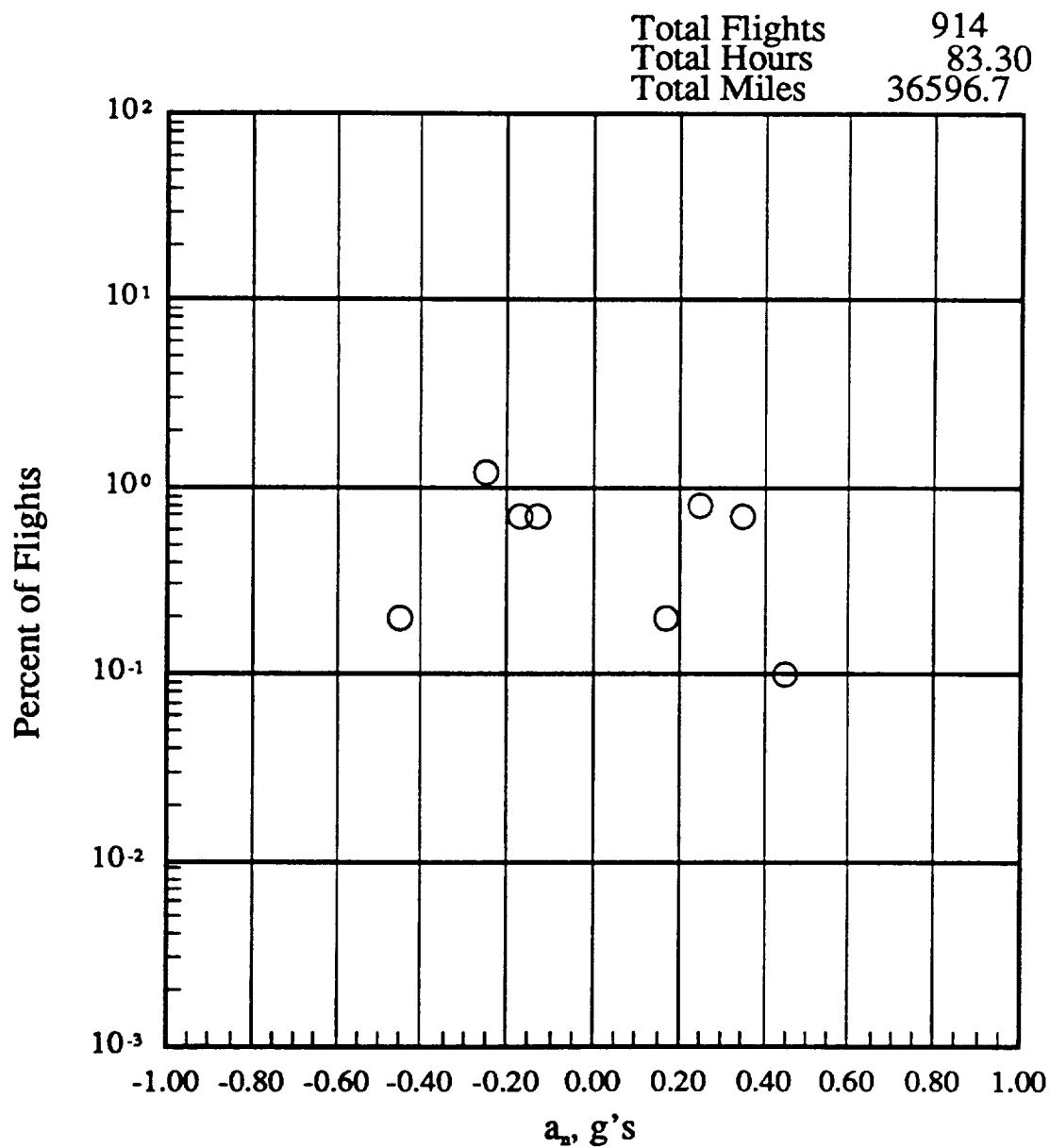
(d) 9500 to 14500 feet altitude

Figure 16.- Continued.



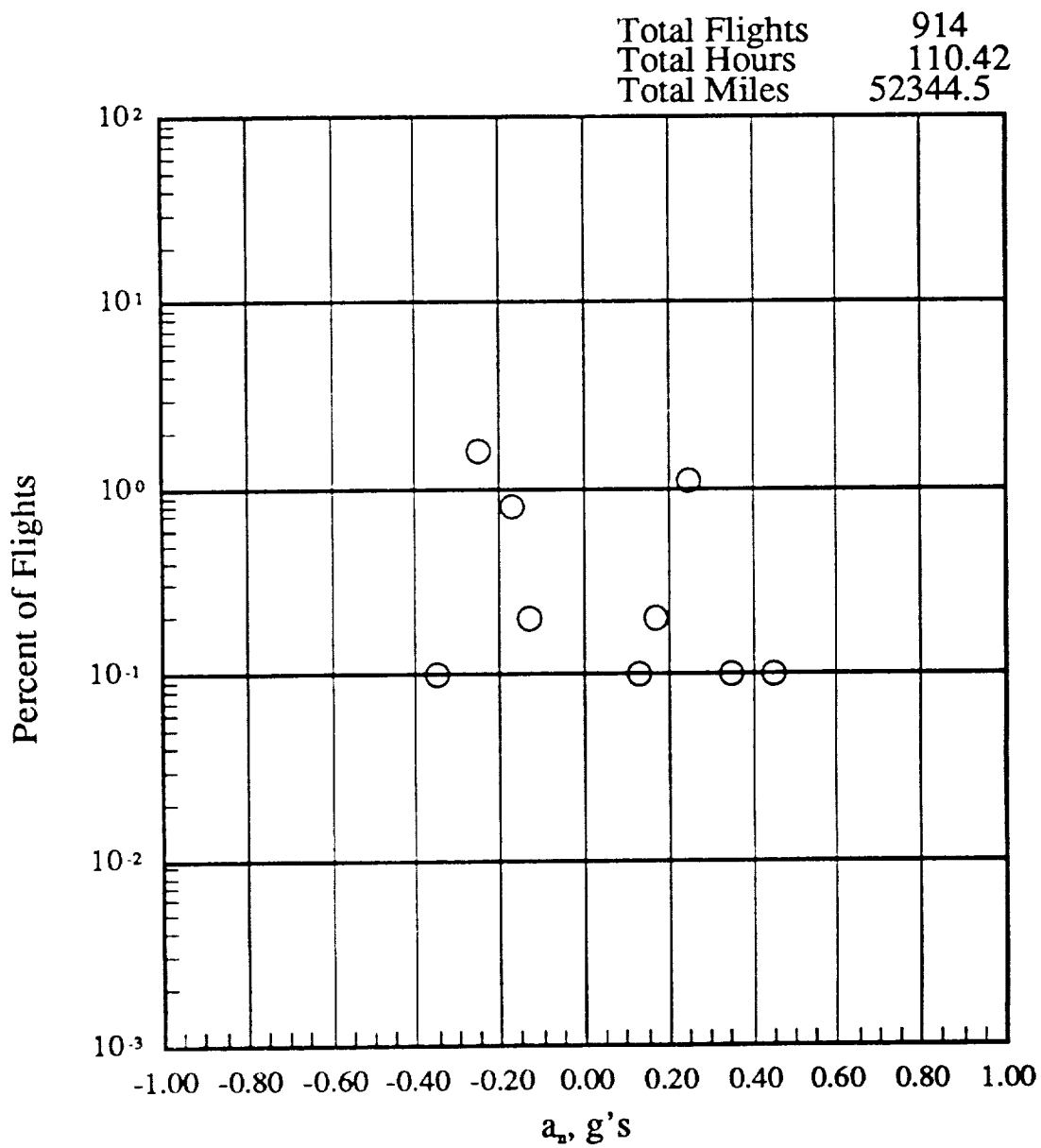
(e) 14500 to 19500 feet altitude

Figure 16.- Continued.



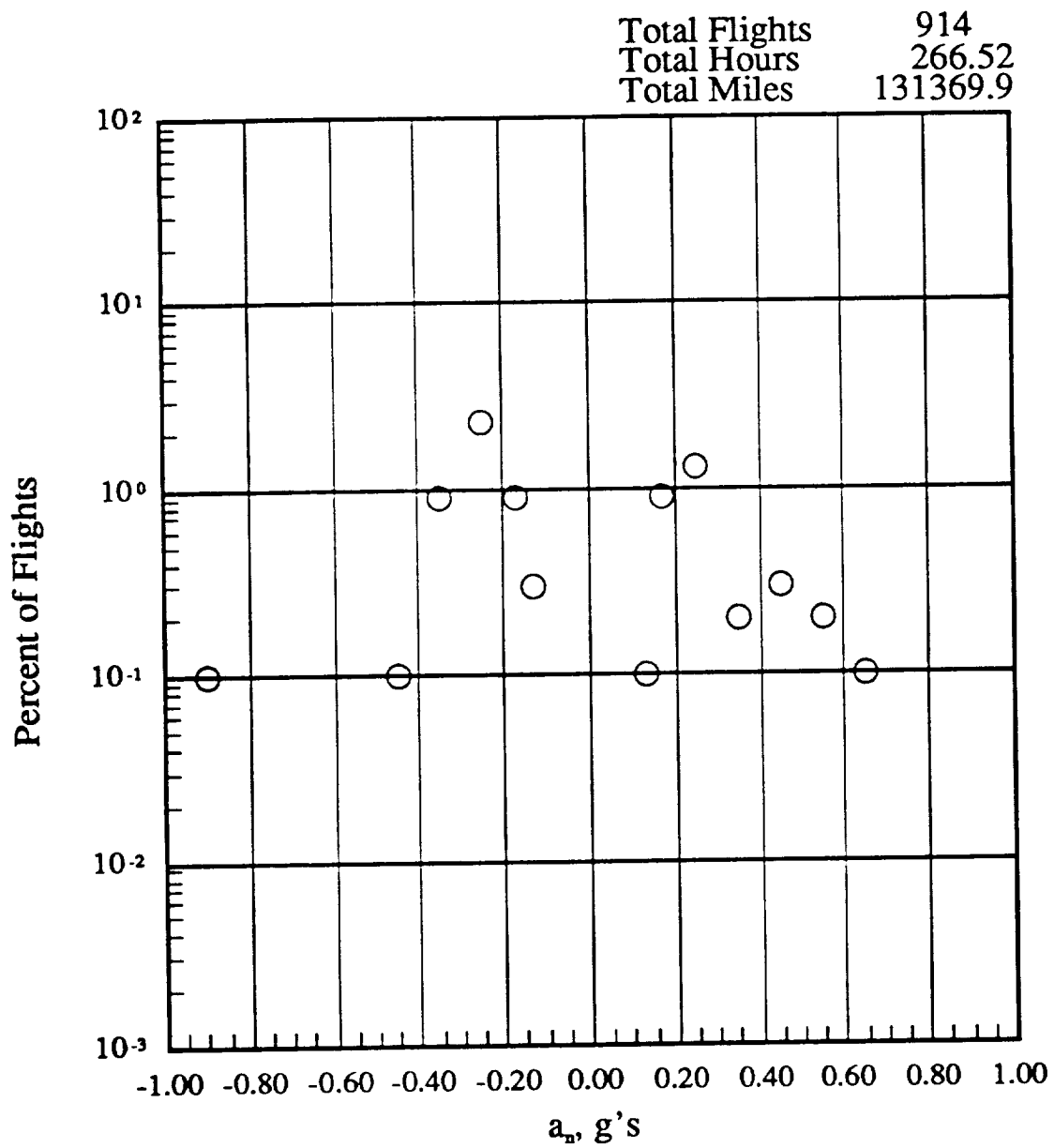
(f) 19500 to 24500 feet altitude

Figure 16.- Continued.



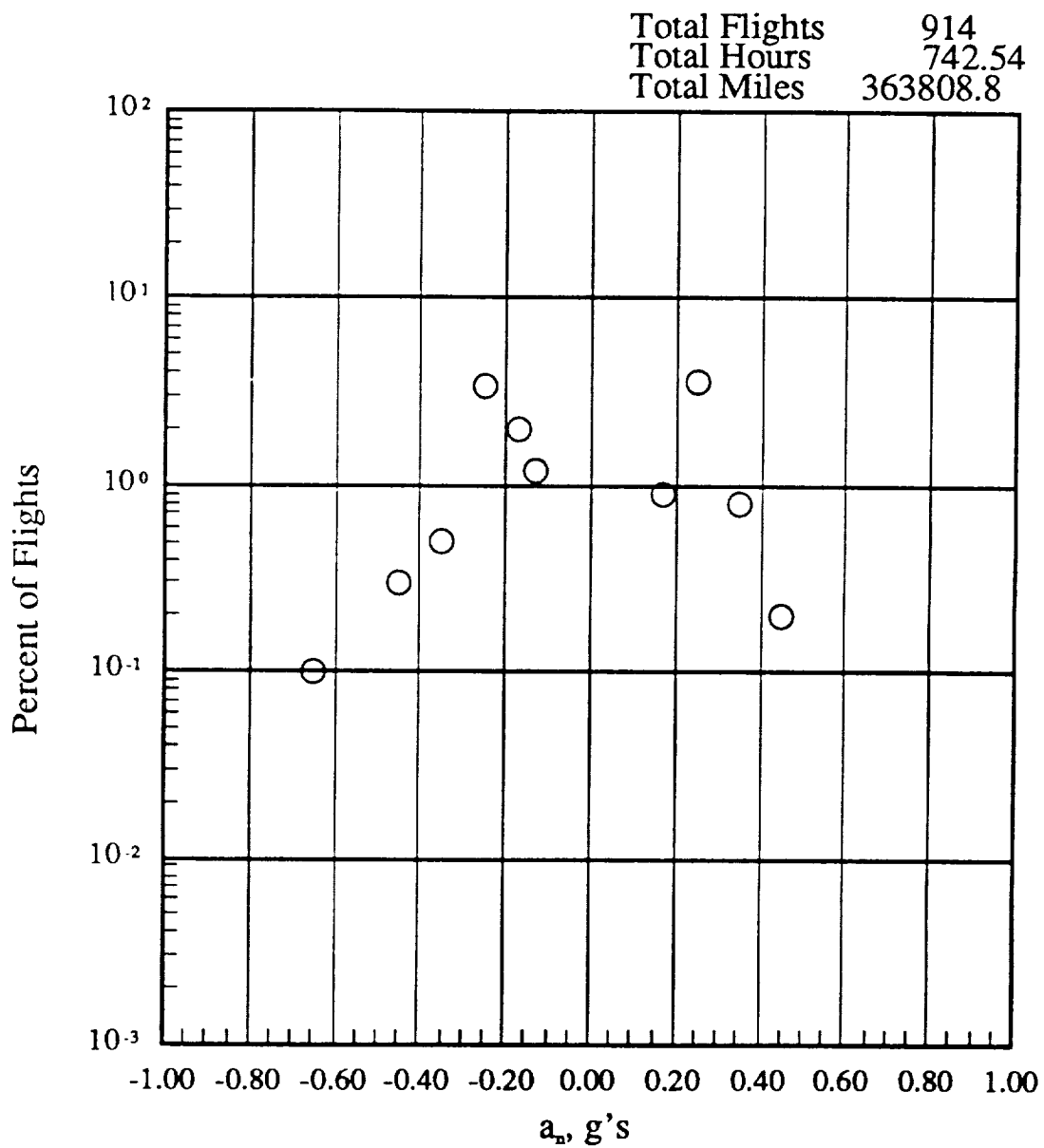
(g) 24500 to 29500 feet altitude

Figure 16.- Continued.



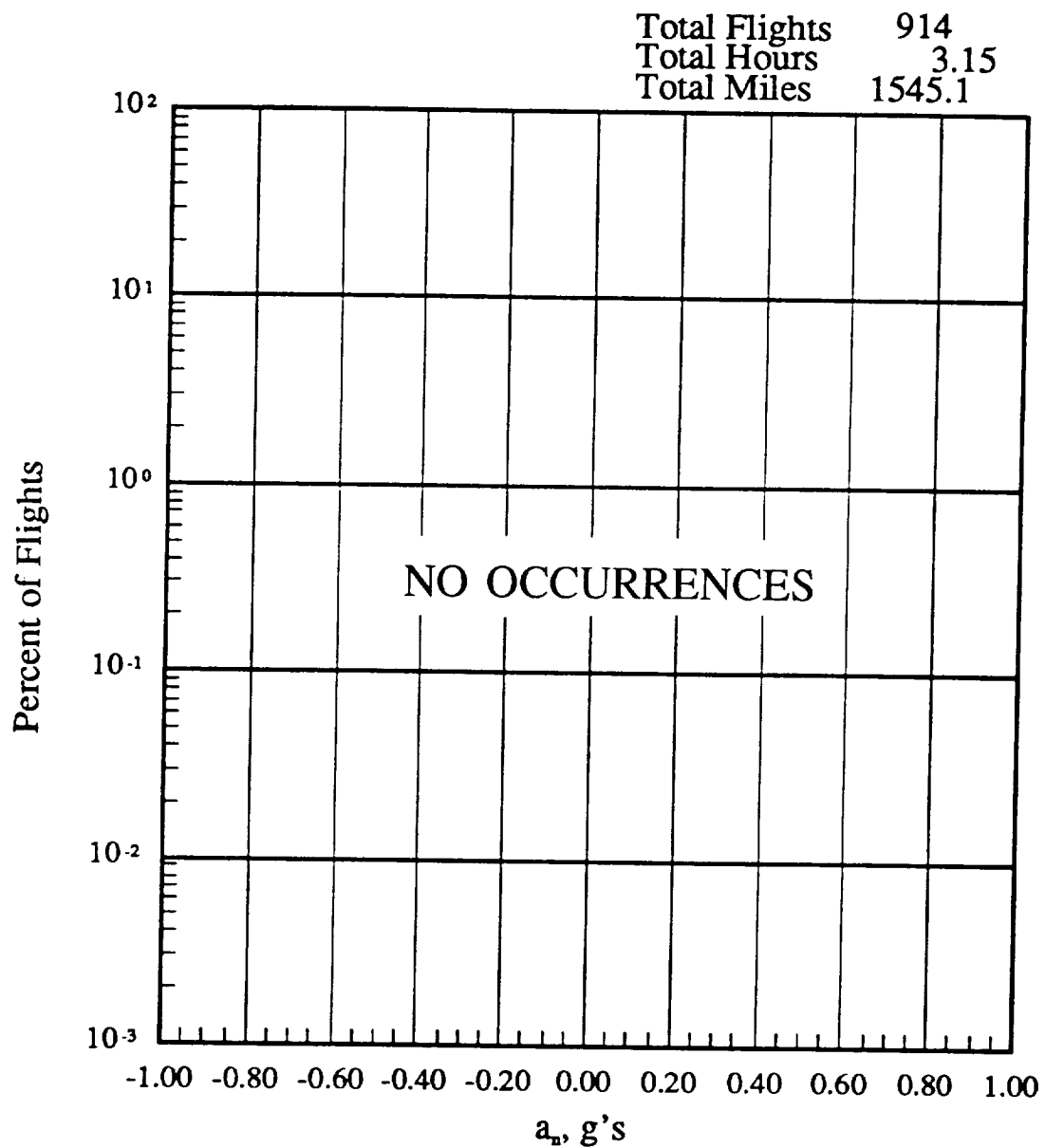
(h) 29500 to 34500 feet altitude

Figure 16.- Continued.



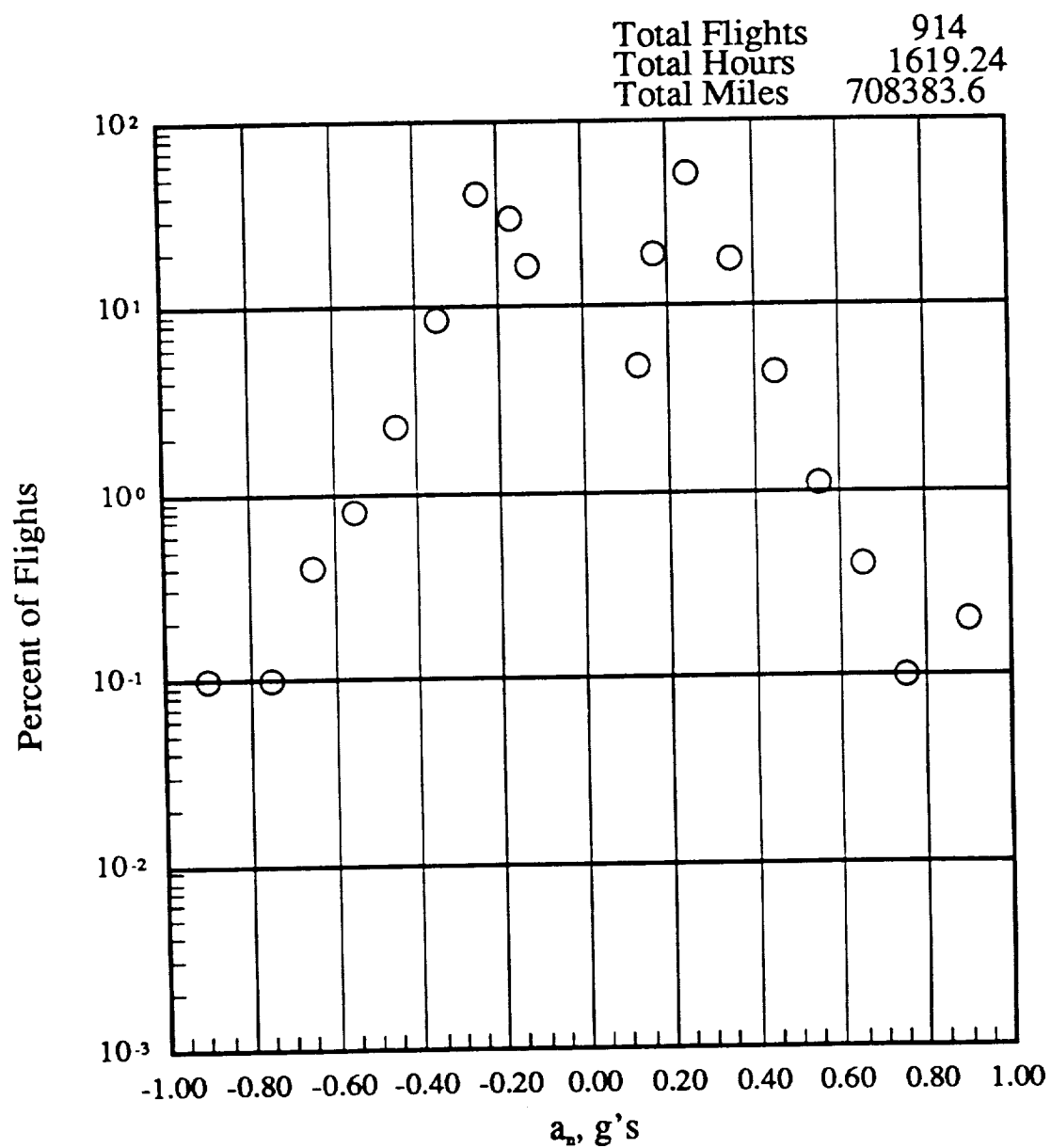
(i) 34500 to 39500 feet altitude

Figure 16.- Continued.



(j) 39500 to 44500 feet altitude

Figure 16.- Continued.



(k) -500 to 44500 feet altitude

Figure 16.- Concluded.

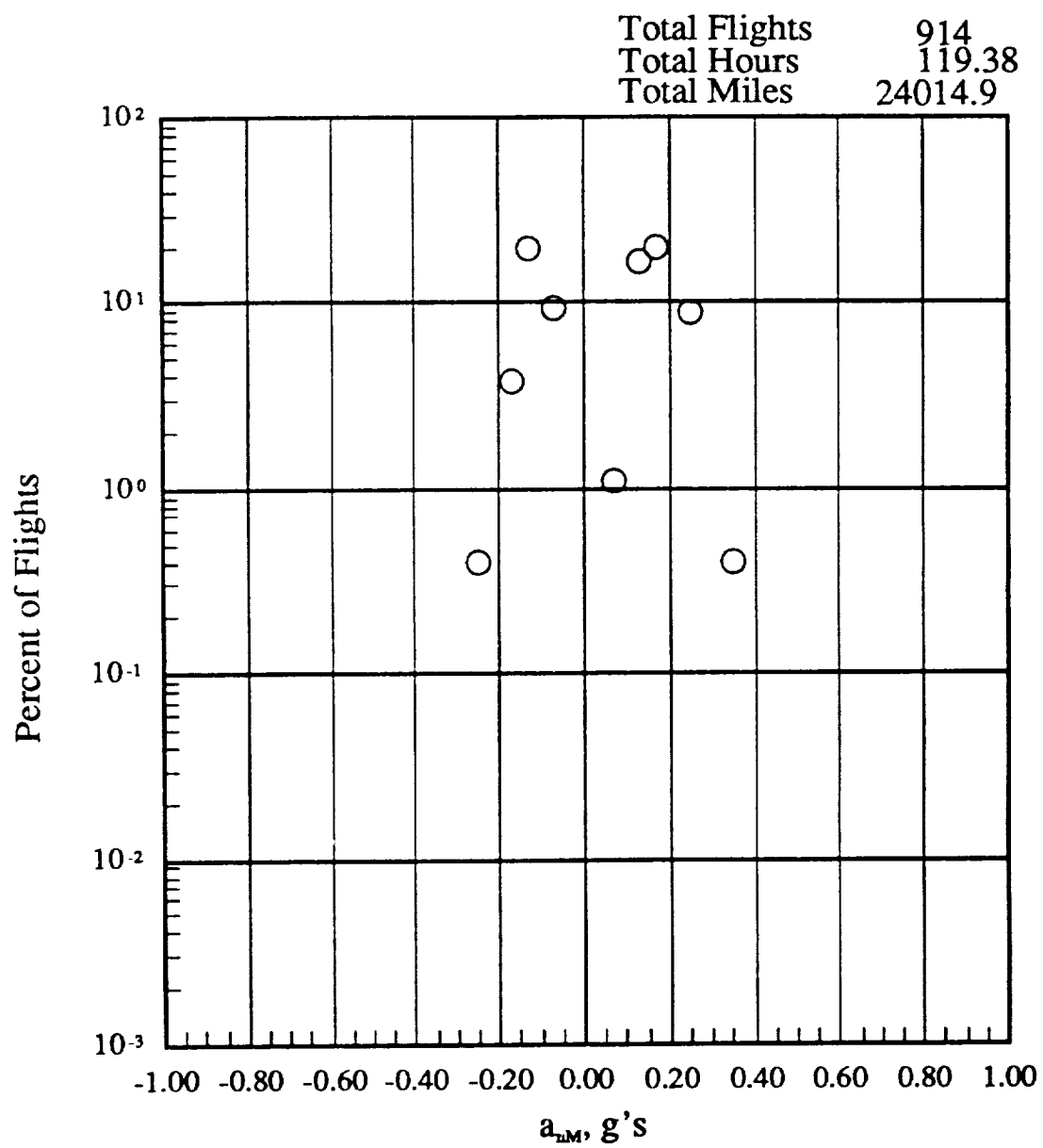
PRESSURE ALTITUDE BANDS

MAXIMUM $a_{NM}$ LEVEL FOR EACH FLIGHT g's FROM TO	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
1.60 1.80	0	0	0	0	0	0	0	0	0	0
1.40 1.60	0	0	0	0	0	0	0	0	0	0
1.20 1.40	0	0	0	0	0	0	0	0	0	0
1.00 1.20	0	0	0	0	0	0	0	0	0	0
.80 1.00	0	0	0	0	0	0	0	0	0	0
.70 .80	0	0	0	0	0	0	0	0	0	0
.60 .70	0	0	0	0	0	0	0	0	0	0
.50 .60	0	0	0	0	0	0	0	0	0	0
.40 .50	0	0	0.1	0	0	0	0	0	0	0
.30 .40	0.4	0.7	0.2	0.2	0.1	0	0	0	0	0.1
.20 .30	8.9	5.9	1.5	1.0	0.4	0.3	0.2	0	0	1.8
.15 .20	19.9	12.3	4.2	1.4	1.2	0.5	1.0	0.3	0	18.7
.10 .15	16.7	11.6	4.6	1.4	0.2	0.1	0.3	0.2	0	40.8
.05 .10	1.1	1.2	0.5	0.3	0	0	0.1	0.1	0	35.2
										3.4
-0.05 -0.10	9.4	4.7	5.0	1.8	0.5	0.9	1.0	0	0	24.2
-0.10 -0.15	19.7	16.1	11.2	6.0	2.1	1.1	1.4	0	0	59.1
-0.15 -0.20	3.8	3.5	3.1	1.6	0.8	0.4	0.3	0	0	14.4
-0.20 -0.30	0.4	0.7	0.3	0.2	0.1	0.1	0.2	0	0	2.3
-0.30 -0.40	0	0	0	b0	0	0	0	0	0	0
-0.40 -0.50	0	0	0	0	0	0	0	0	0	0
-0.50 -0.60	0	0	0	0	0	0	0	0	0	0
-0.60 -0.70	0	0	0	0	0	0	0	0	0	0
-0.70 -0.80	0	0	0	0	0	0	0	0	0	0
-0.80 -1.00	0	0	0	0	0	0	0	0	0	0
-1.00 -1.20	0	0	0	0	0	0	0	0	0	0
-1.20 -1.40	0	0	0	0	0	0	0	0	0	0
-1.40 -1.60	0	0	0	0	0	0	0	0	0	0
-1.60 -1.80	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT	119.38	108.04	108.72	77.17	83.30	110.42	266.52	3.15	1619.24	
FLIGHT MILES @ ALT	24014.89	29500.10	37757.94	31445.86	36596.71	52344.52	131369.93	1545.14	708383.64	
TOTAL FLIGHTS										914.0

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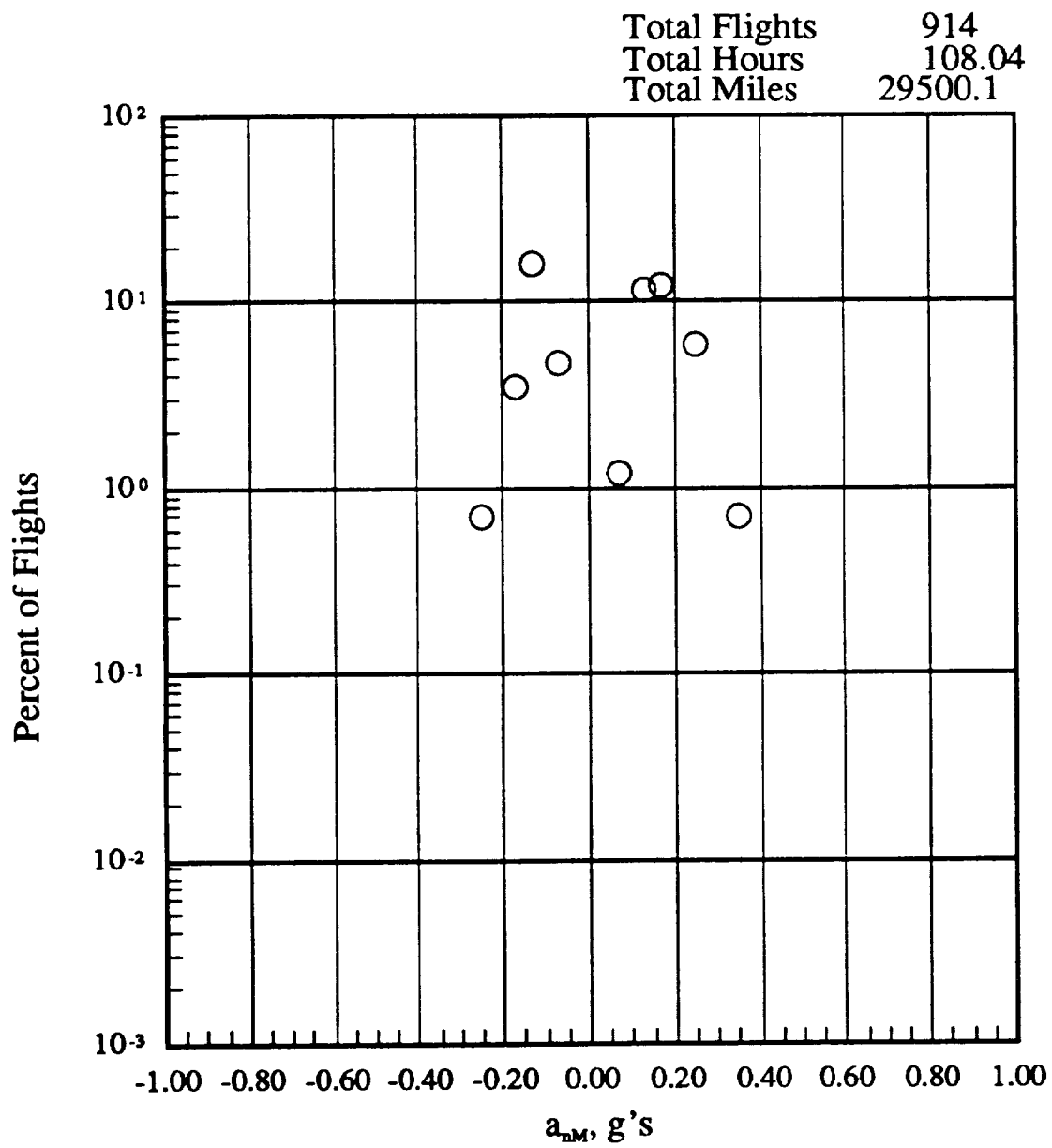
(a) Percent of flights where peak positive and negative  $a_{NM}$  per flight  
occurs within pressure altitude bands, any flap

Figure 17.- Peak Positive and negative  $a_{NM}$  vs. altitude.



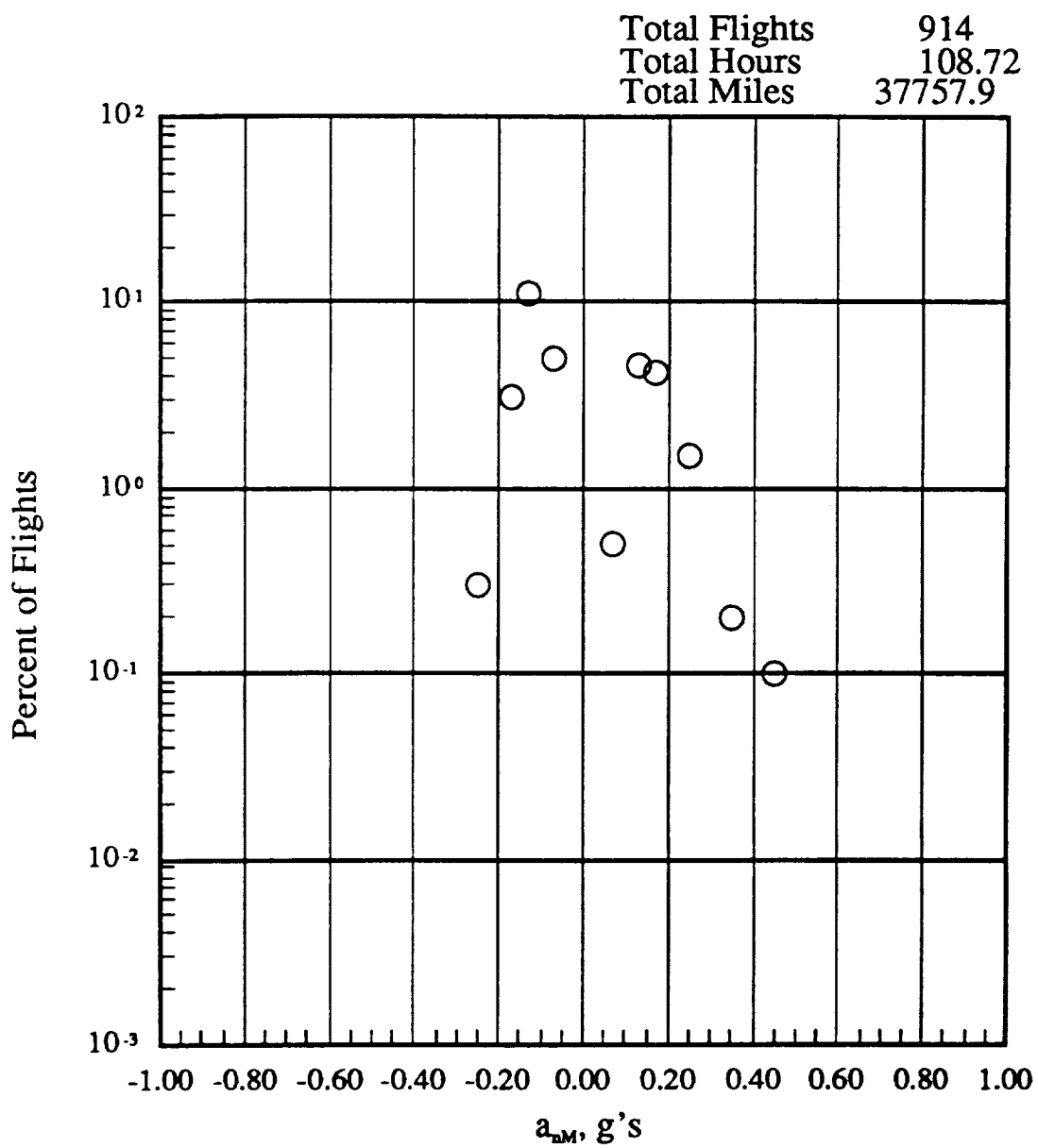
(b) -500 to 4500 feet altitude

Figure 17.- Continued.



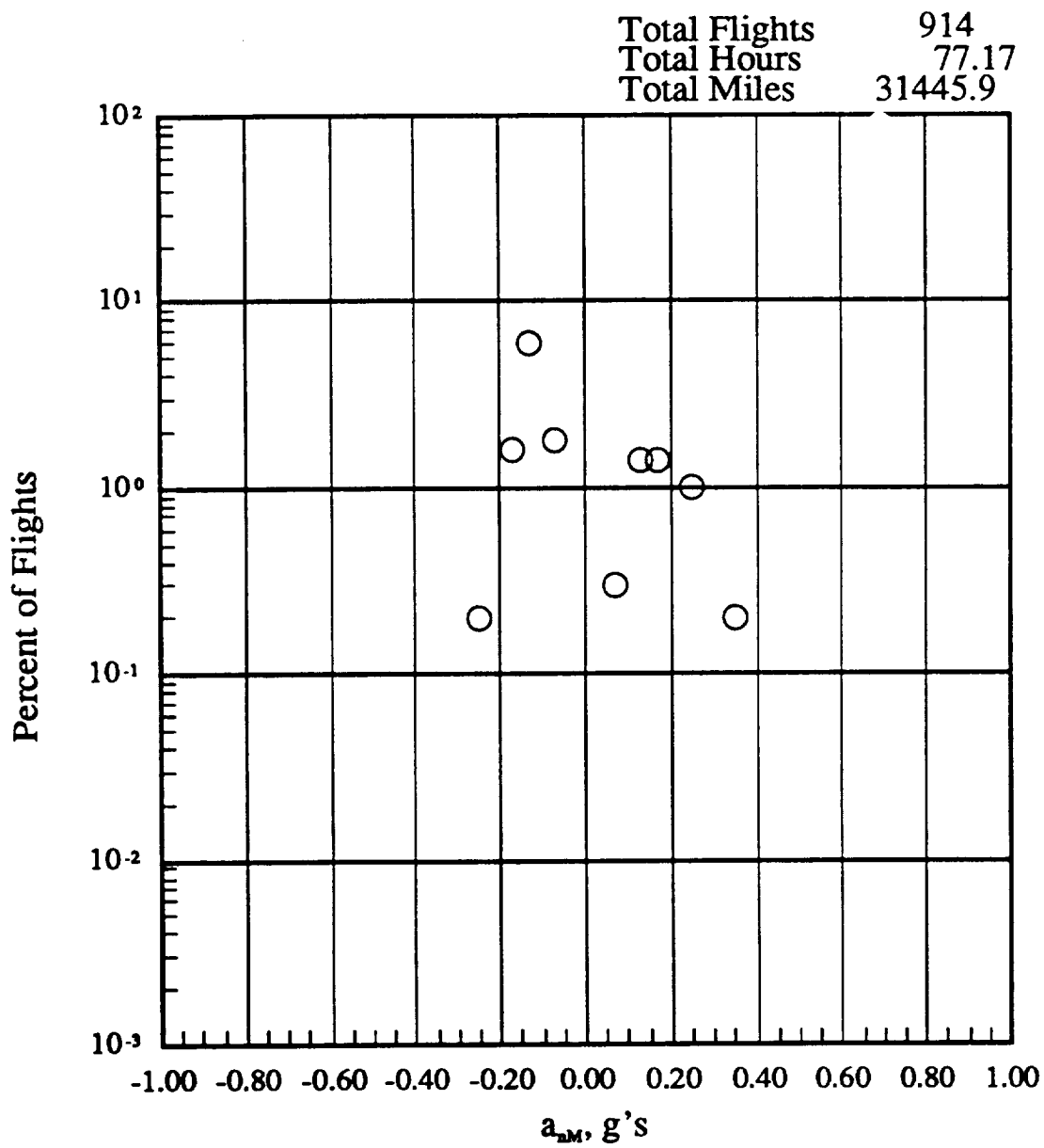
(c) 4500 to 9500 feet altitude

Figure 17.- Continued.



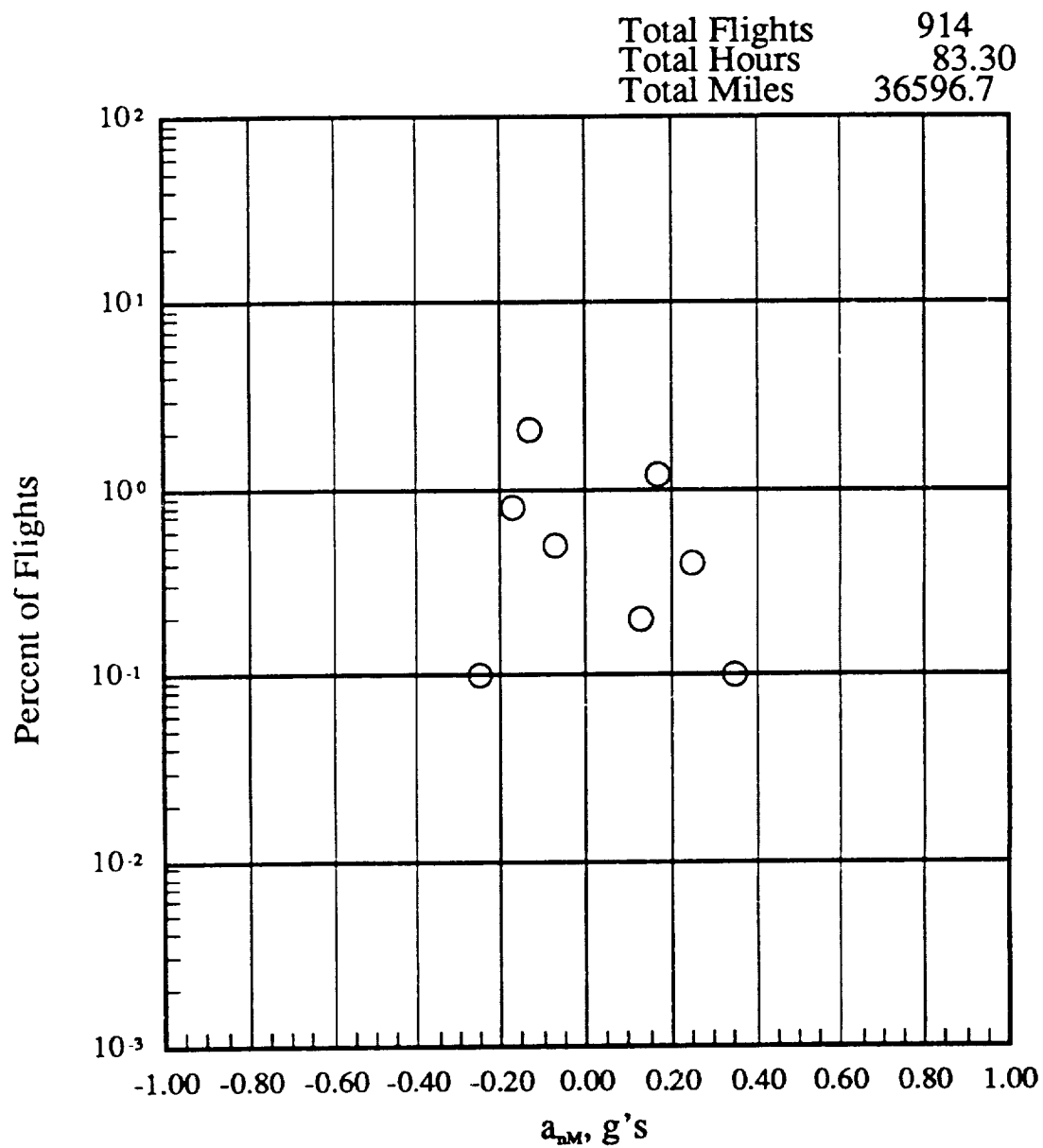
(d) 9500 to 14500 feet altitude

Figure 17.- Continued.



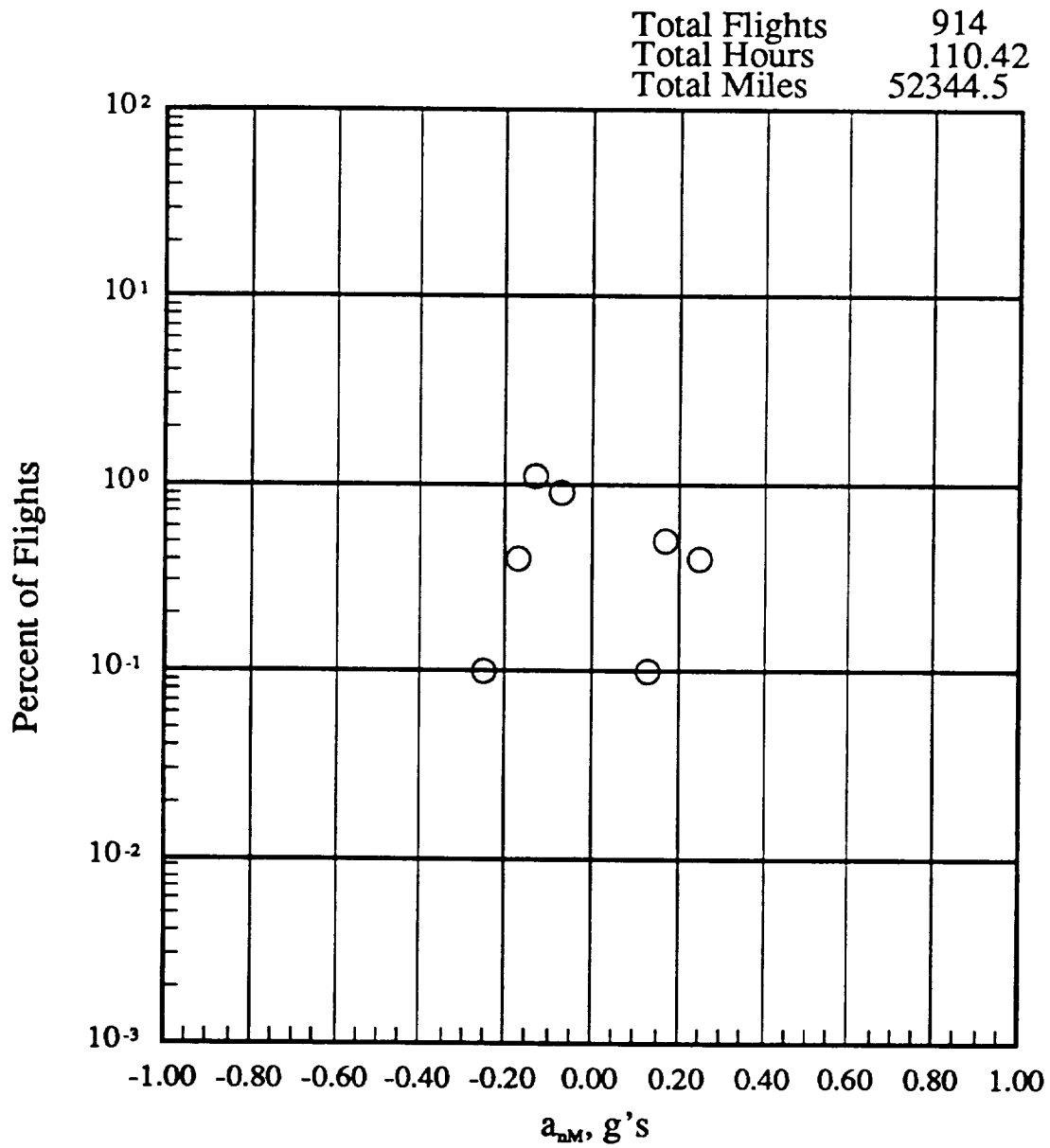
(e) 14500 to 19500 feet altitude

Figure 17.- Continued.



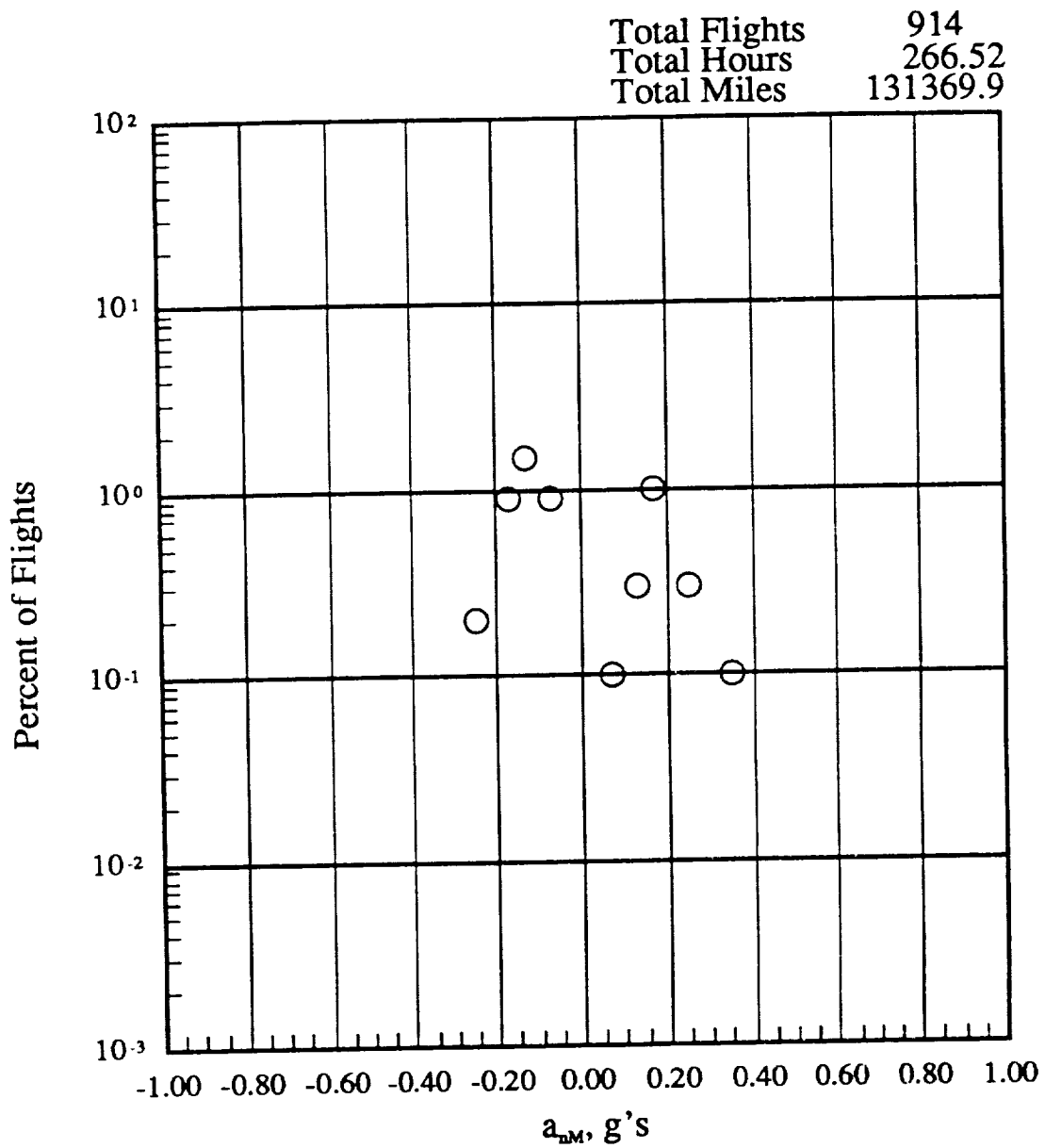
(f) 19500 to 24500 feet altitude

Figure 17.- Continued.



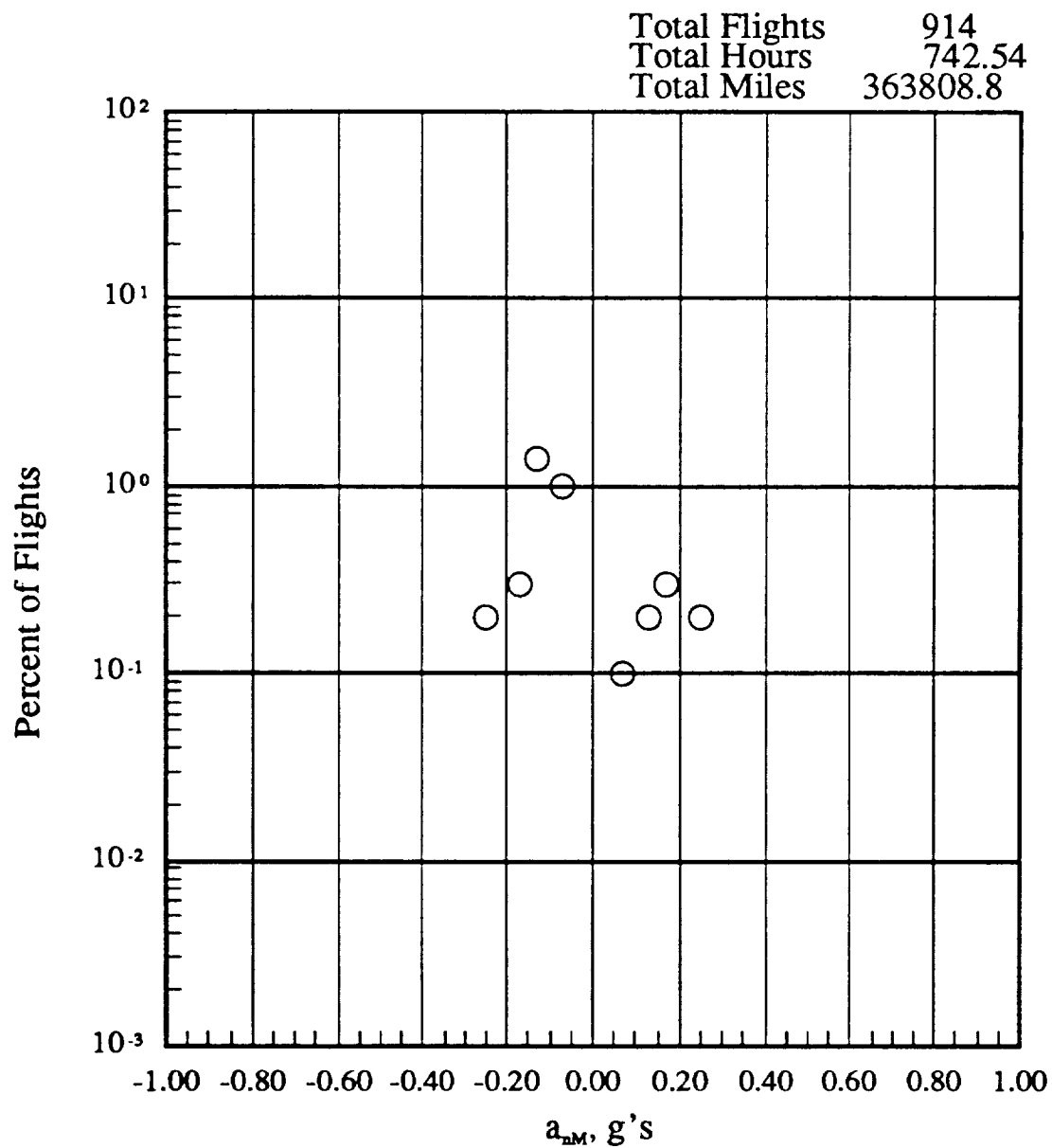
(g) 24500 to 29500 feet altitude

Figure 17.- Continued.



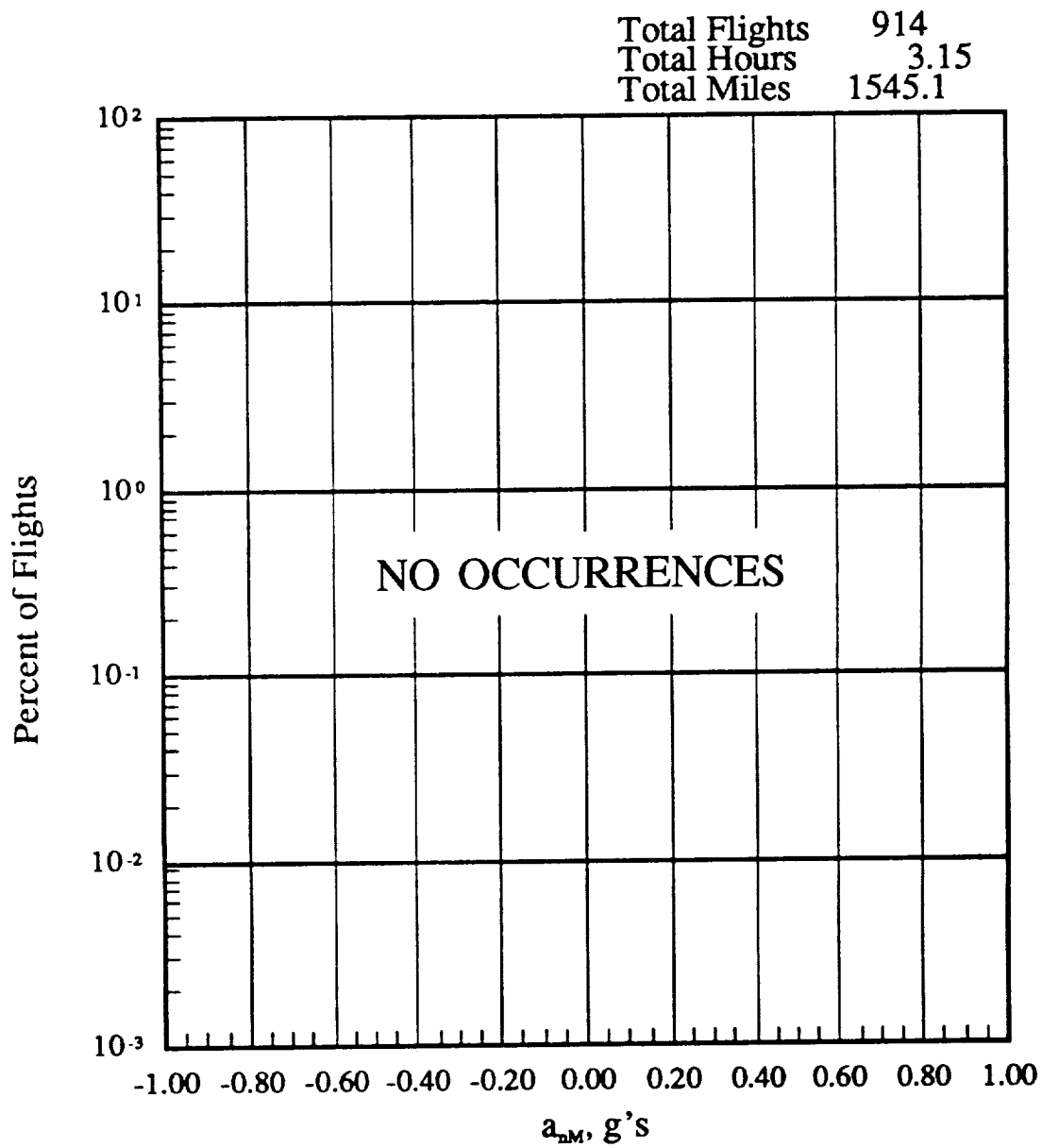
(h) 29500 to 34500 feet altitude

Figure 17.- Continued.



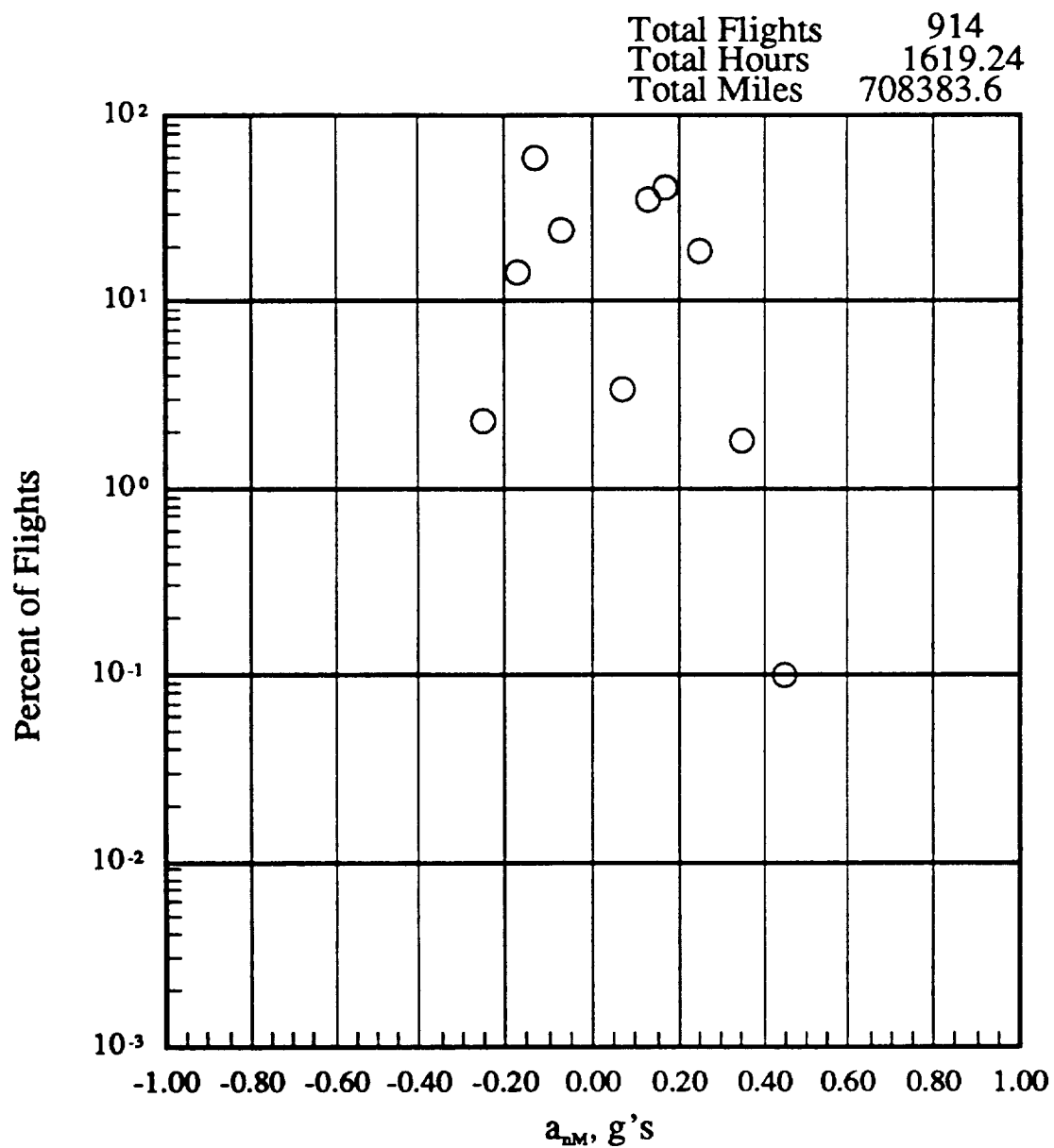
(i) 34500 to 39500 feet altitude

Figure 17.- Continued.



(j) 39500 to 44500 feet altitude

Figure 17.- Continued.



(k) -500 to 44500 feet altitude

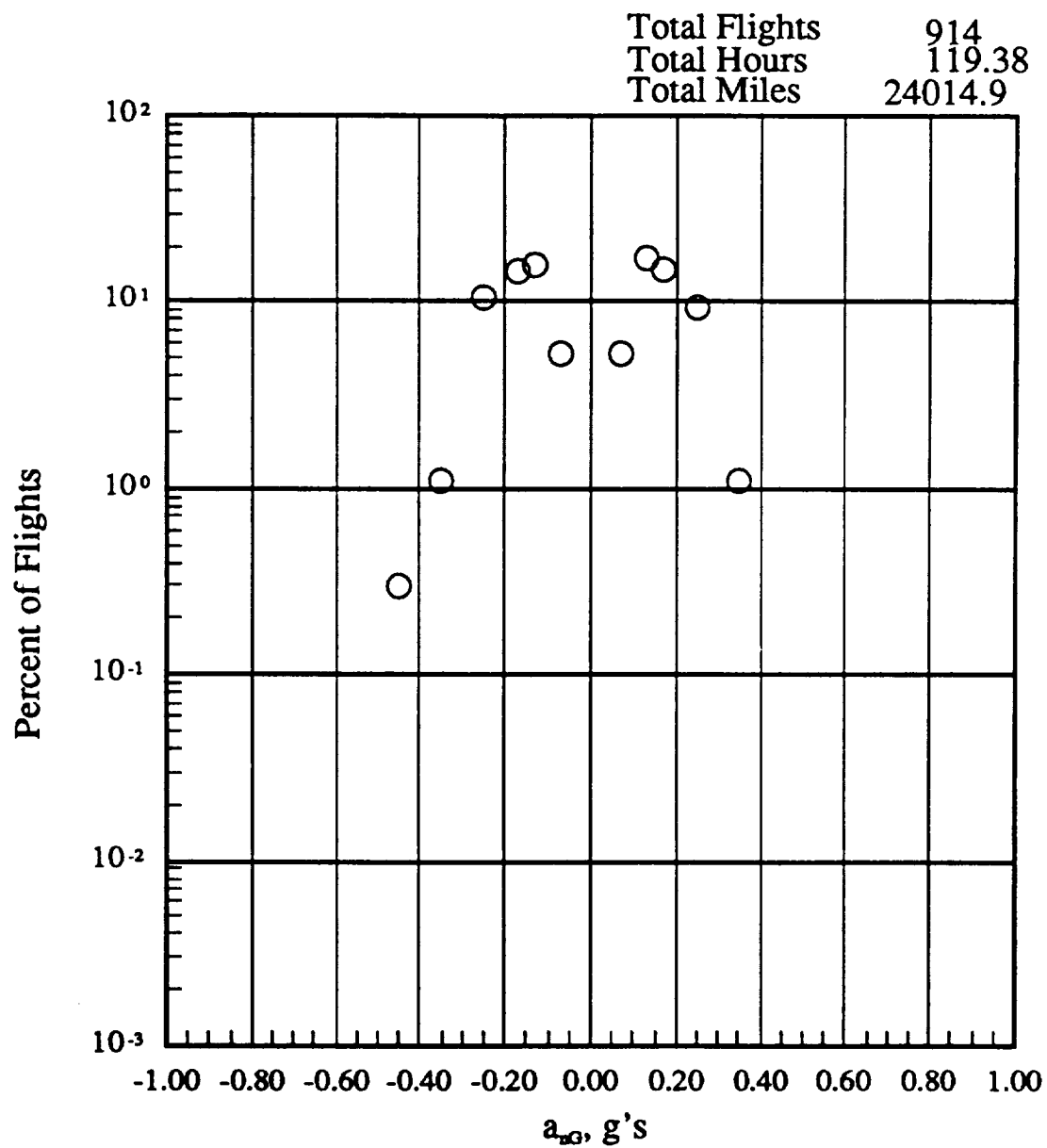
Figure 17.- Concluded.

PRESSURE ALTITUDE BANDS

MAXIMUM $a_{nG}$ LEVEL FOR EACH FLIGHT	9's FROM TO	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
1.60 1.80	0	0	0	0	0	0	0	0	0	0	0
1.40 1.60	0	0	0	0	0	0	0	0	0	0	0
1.20 1.40	0	0	0	0	0	0	0	0	0	0	0
1.00 1.20	0	0	0	0	0	0	0	0	0	0	0
.80 1.00	0	0	0	0	0	0	0	0	0	0	0
.70 .80	0	0	0.1	0	0	0	0	0	0	0	0.1
.60 .70	0	0.2	0	0	0	0	0	0	0	0	0.2
.50 .60	0	0.3	0	0.2	0	0	0	0	0	0	0.5
.40 .50	0	0.4	0.7	0	0.1	0	0.1	0	0	0	1.3
.30 .40	1.1	0.9	1.5	0.4	0	0.1	0.8	0.3	0	0	5.1
.20 .30	9.4	4.5	3.3	1.6	0.8	0.5	2.6	2.6	0	0	23.5
.15 .20	15.0	4.0	2.6	1.0	0.7	0.9	2.1	3.8	0	0	30.1
.10 .15	17.3	4.0	2.3	0.7	1.4	0.7	1.6	1.6	0	0	29.6
.05 .10	5.3	1.3	0.9	0.5	0.3	0.2	0.5	0.3	0	0	9.4
-.05	5.3	1.9	0.5	0.4	0.2	0.1	0.5	0.8	0	0	9.7
-.10	15.9	4.5	2.3	1.1	0.9	0.7	1.6	2.5	0	0	29.4
-.15	14.7	3.5	2.7	1.4	0.9	0.5	1.3	3.3	0	0	28.3
-.20	10.6	4.6	4.4	1.1	0.2	0.8	1.2	2.2	0	0	25.1
-.30	1.1	1.3	1.0	0.5	0	0	0.4	0.5	0	0	5.0
-.40	0.3	0.8	0.2	0.1	0	0	0	0.1	0	0	1.5
-.50	0	0.3	0.2	0	0	0	0	0	0	0	0.5
-.60	0	0	0	0.1	0	0	0	0	0	0	0.1
-.70	0	0	0	0	0	0	0.1	0	0	0	0.1
-.80	0	0	0	0	0	0	0	0	0	0	0
-.90	0	0.1	0	0	0	0	0	0	0	0	0
-1.00	0	0	0	0	0	0	0	0	0	0	0
-1.20	0	0	0	0	0	0	0	0	0	0	0
-1.40	0	0	0	0	0	0	0	0	0	0	0
-1.60	0	0	0	0	0	0	0	0	0	0	0
-1.80	0	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT	119.38	108.04	108.72	77.17	83.30	110.42	266.52	742.54	3.15	1619.24	
FLIGHT MILES @ ALT	24014.89	29500.10	37757.94	31445.86	36596.71	52344.52	131369.93	363808.56	1545.14	708383.64	
TOTAL FLIGHTS											914

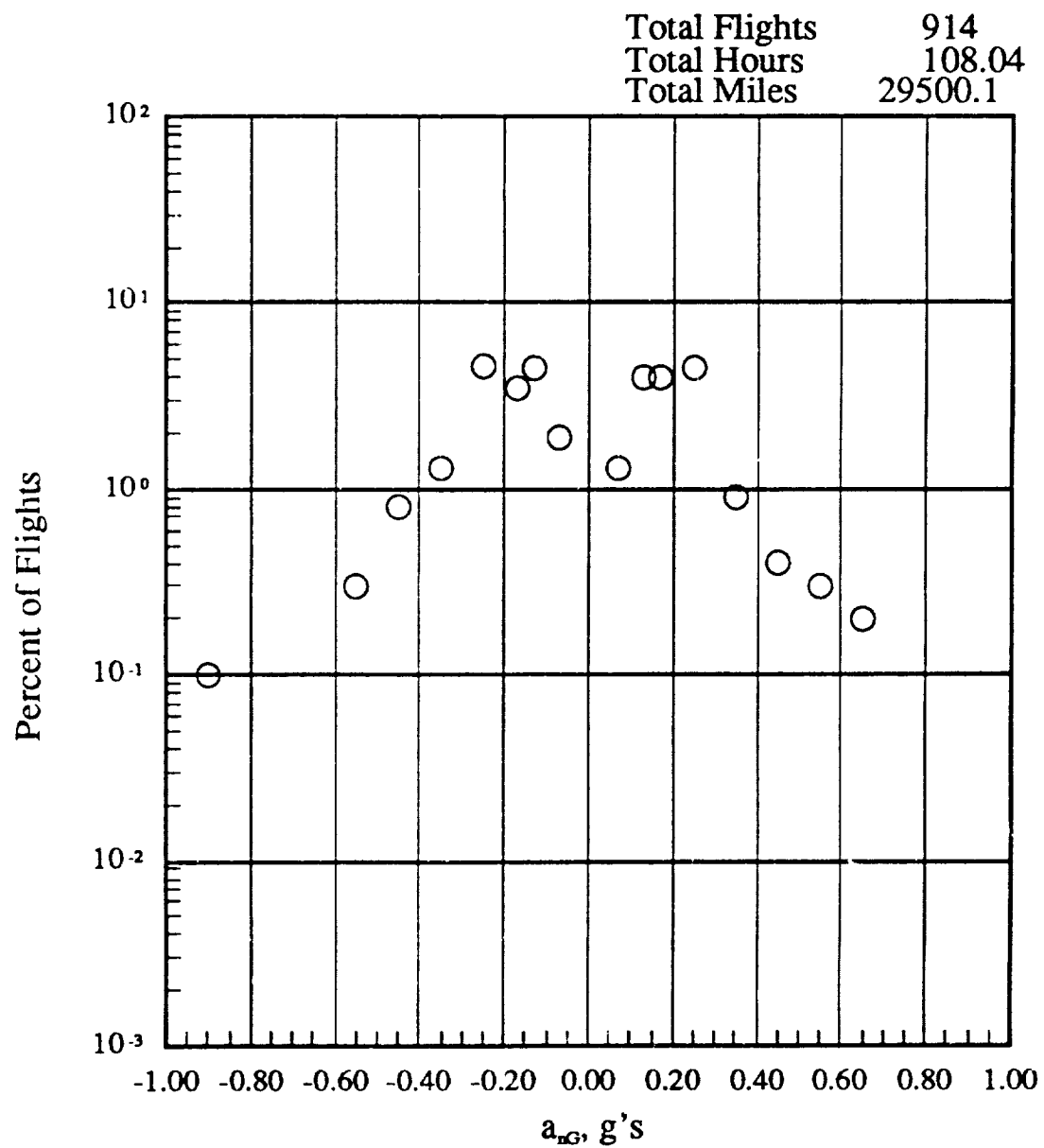
(a)  $a_{nG}$  Percent of flights where peak positive and negative  $a_{nG}$  per flight occurs within pressure altitude bands, any flap

Figure 18.- Peak positive and negative  $a_{nG}$  vs altitude.



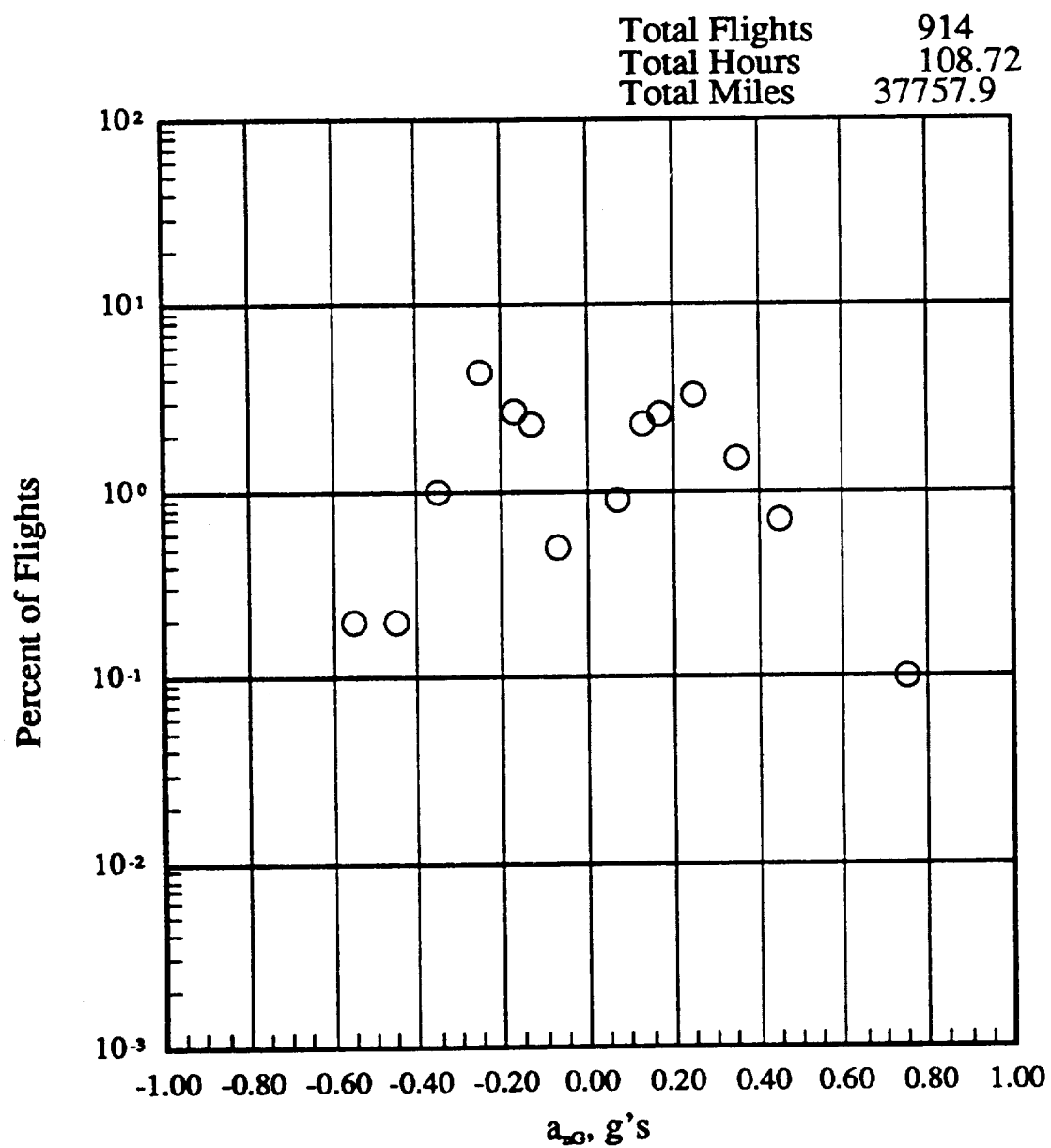
(b) -500 to 4500 feet altitude

Figure 18.- Continued.



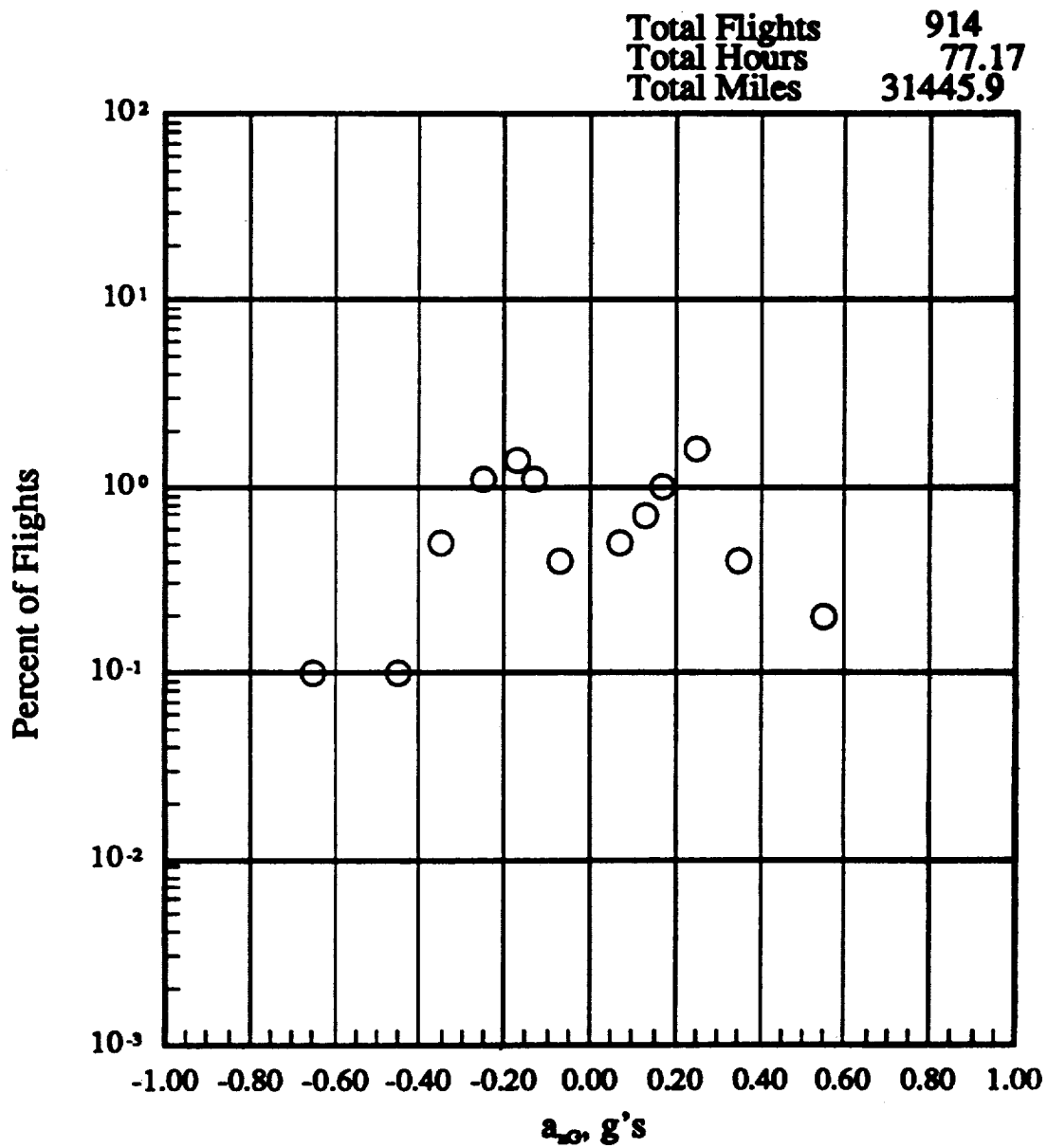
(c) 4500 to 9500 feet altitude

Figure 18.- Continued.



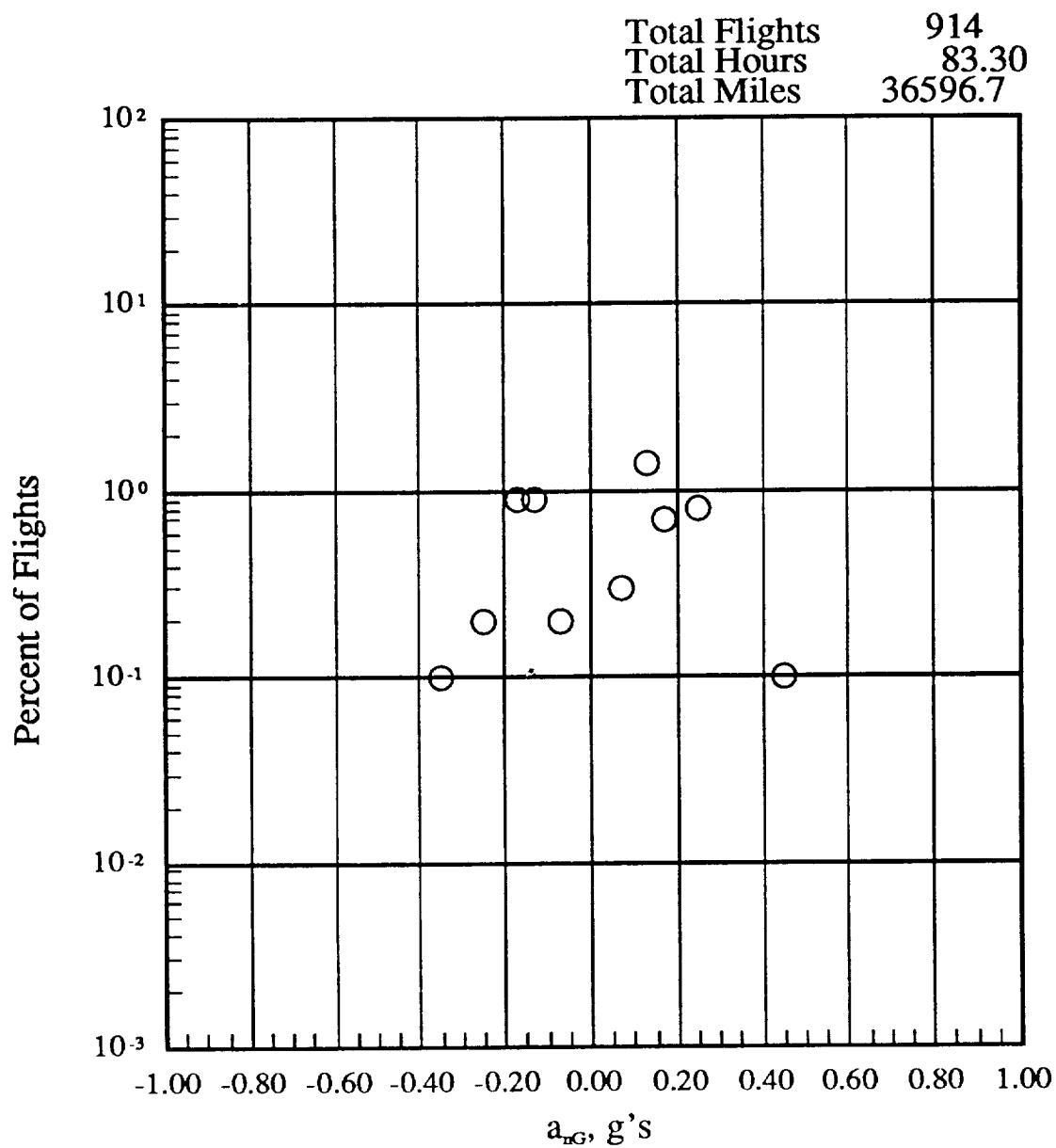
(d) 9500 to 14500 feet altitude

Figure 18.- Continued.



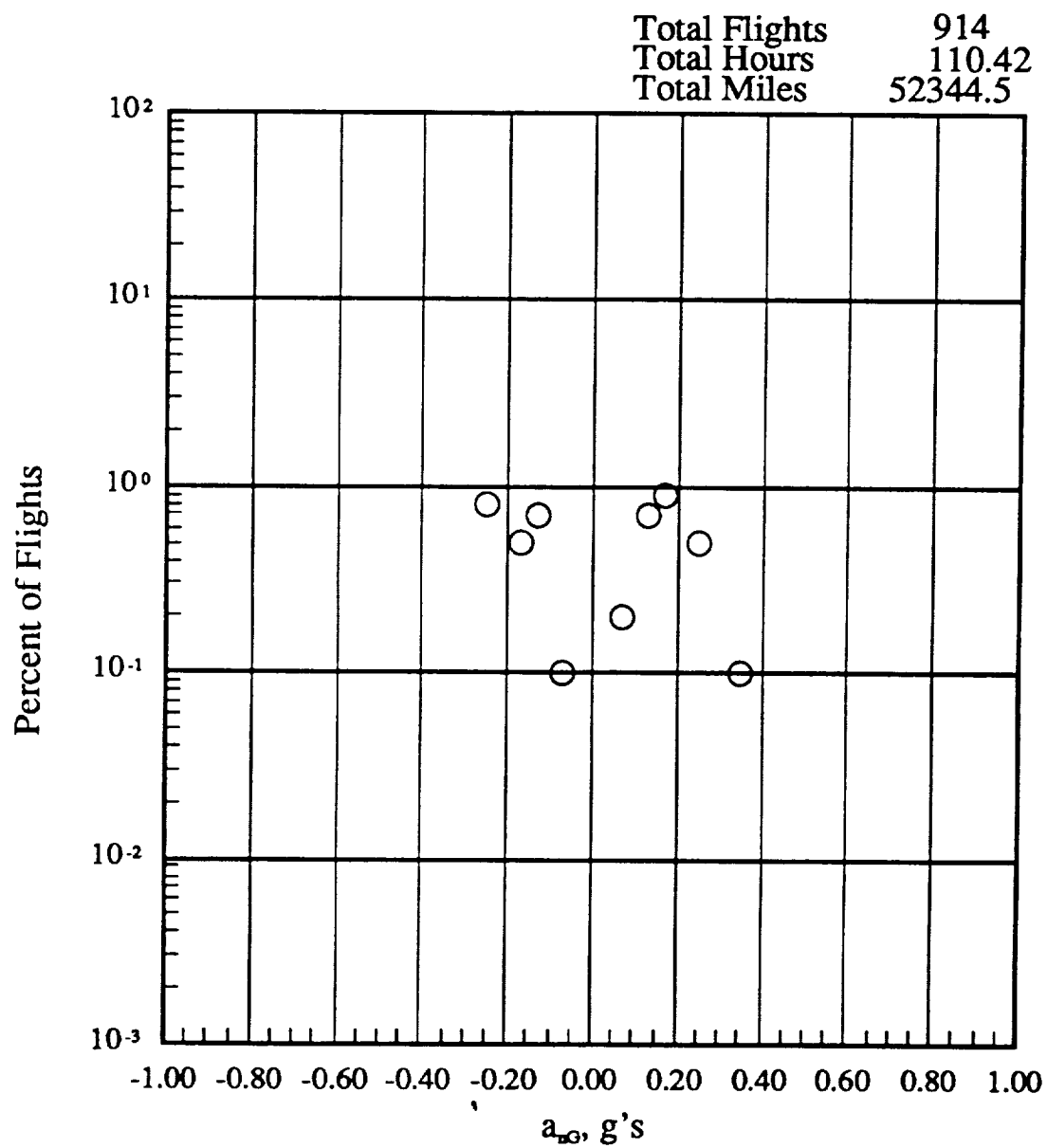
(e) 14500 to 19500 feet altitude

Figure 18.- Continued.



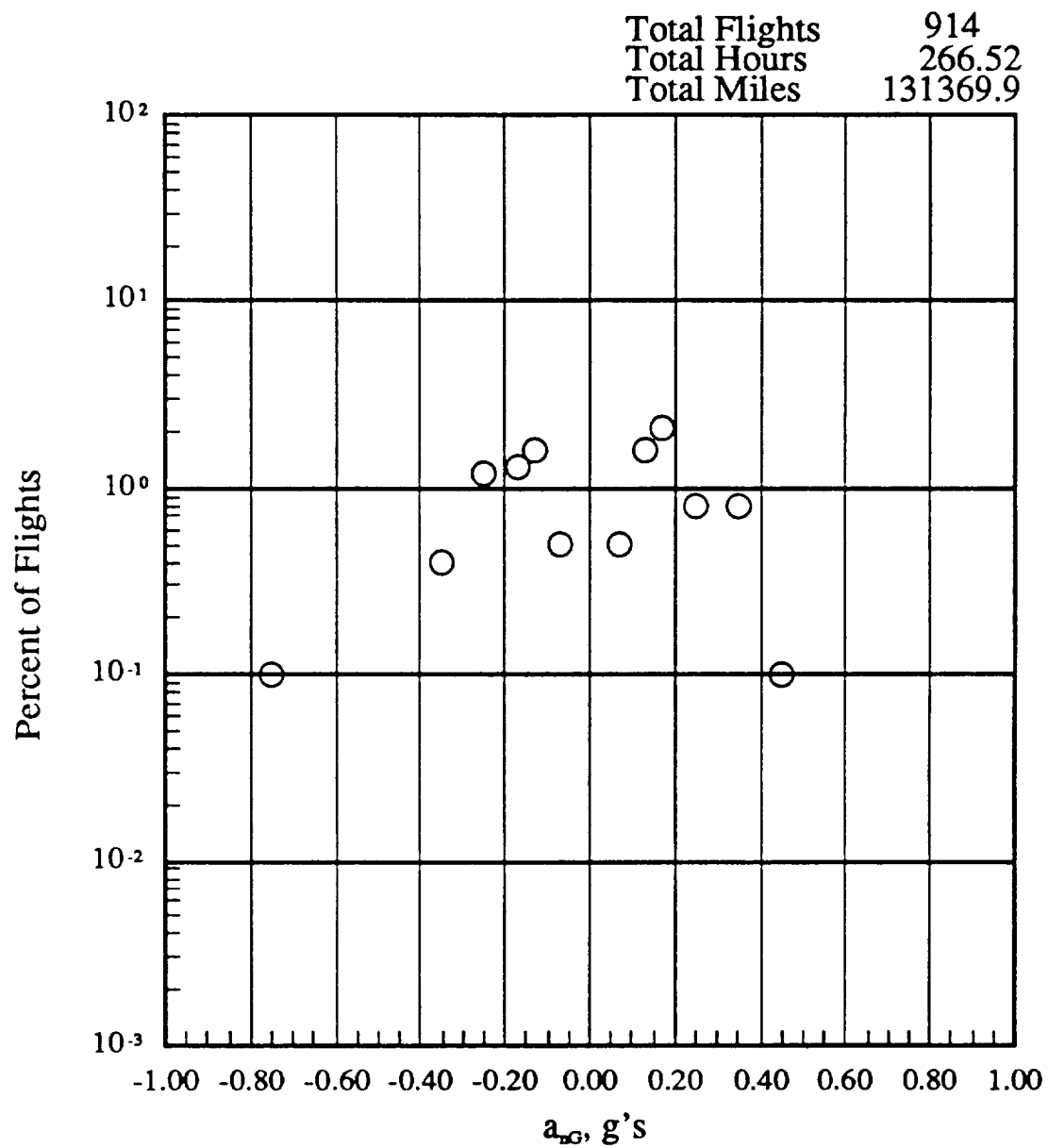
(f) 19500 to 24500 feet altitude

Figure 18.- Continued.



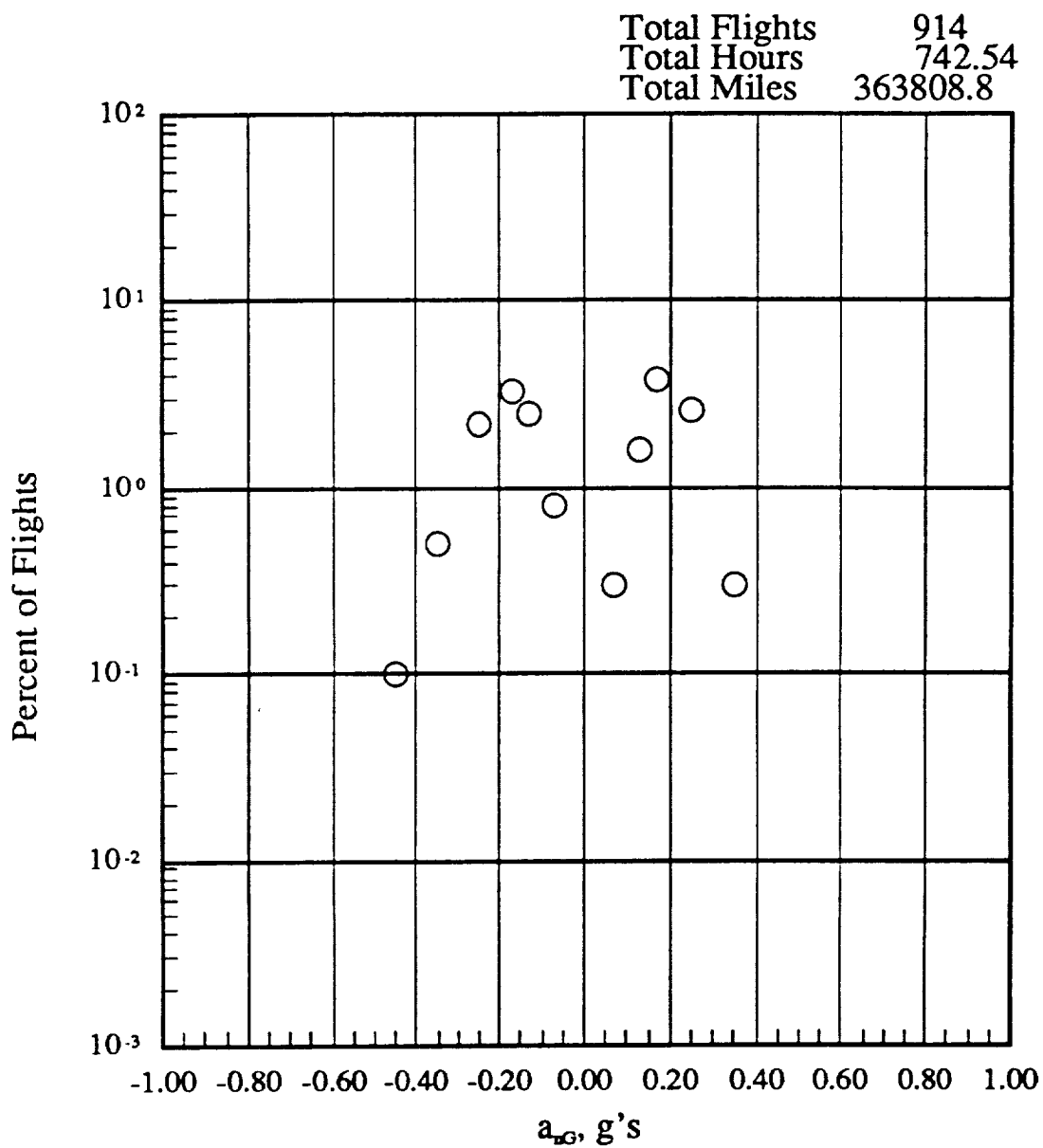
(g) 24500 to 29500 feet altitude

Figure 18.- Continued.



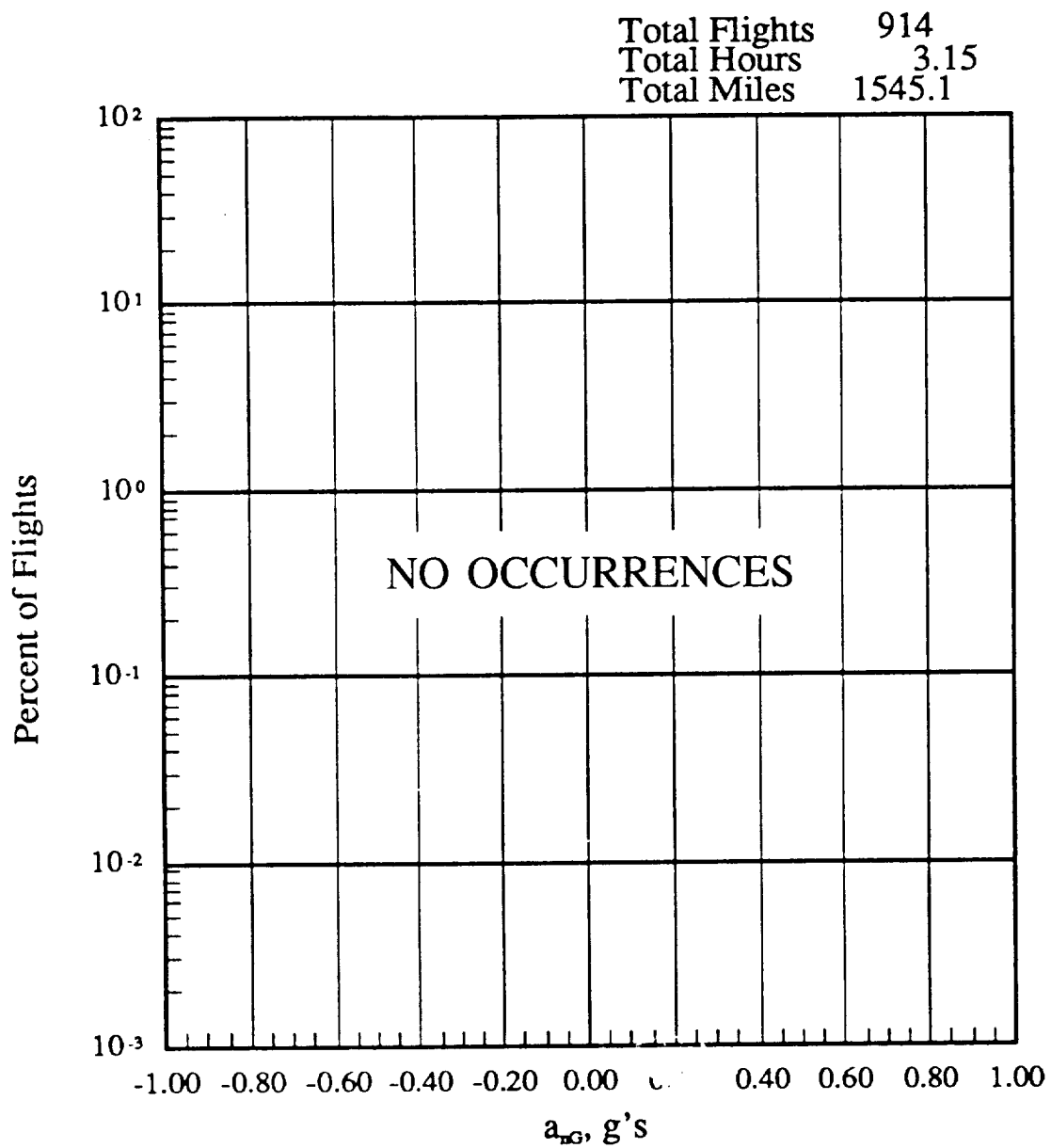
(h) 29500 to 34500 feet altitude

Figure 18.- Continued.



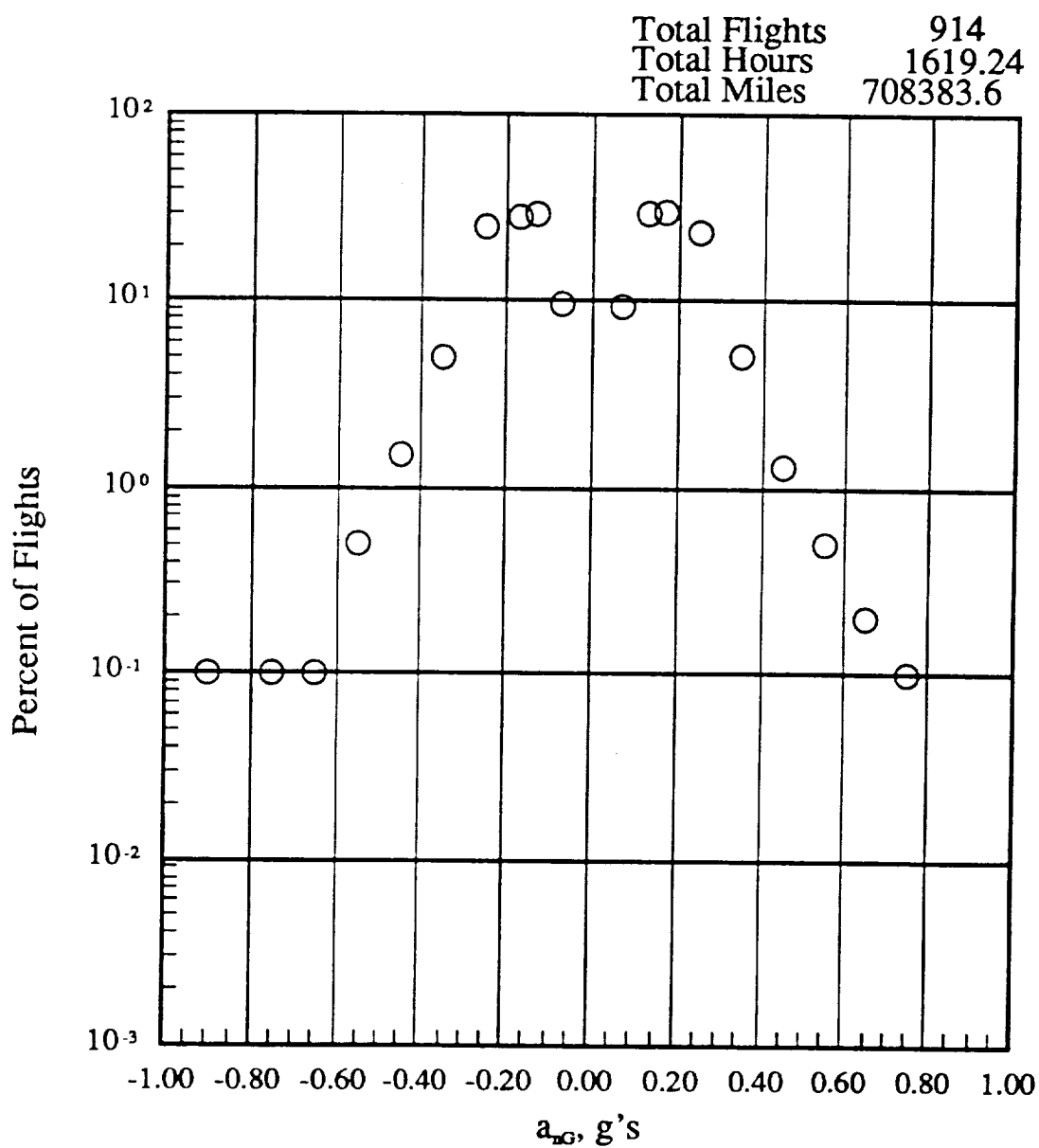
(i) 34500 to 39500 feet altitude

Figure 18.- Continued.



(j) 39500 to 44500 feet altitude

Figure 18.- Continued.



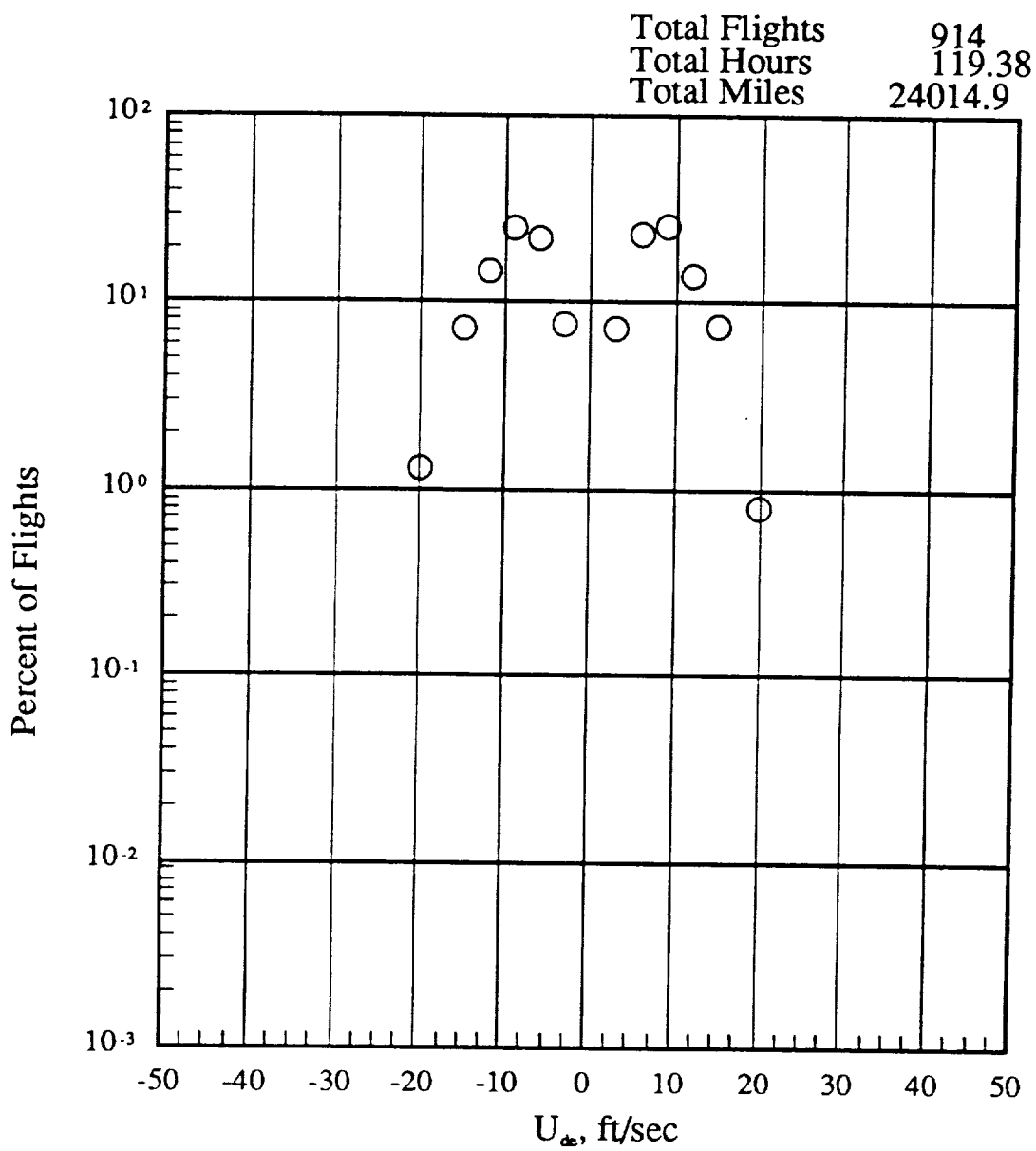
(k) -500 to 44500 feet altitude

Figure 18.- Concluded.

MAXIMUM U <sub>DE</sub> LEVEL FOR EACH FLIGHT FT/SEC	-500 TO		4500 TO		9500 TO		14500 TO		19500 TO		24500 TO		29500 TO		34500 TO		39500 TO		-500 TO	
	4500 FT		9500 FT		14500 FT		19500 FT		24500 FT		29500 FT		34500 FT		39500 FT		44500 FT		44500 FT	
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.1
30	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.1
20	0.8	0.5	0.1	0.1	0.2	0.2	0	0	0	0	0	0	0	0	0	0	0	1.6	0	1.6
15	7.5	1.8	1.4	1.4	0.2	0.2	0.1	0	0	0	0.1	0	0	0	0	0	0	11.2	0	11.2
12	14.0	1.8	0.8	0.8	0	0	0.1	0	0	0	0.3	0	0	0	0	0	0	17.0	0	17.0
9	25.7	3.6	1.3	1.3	0.4	0.4	0.1	0	0.1	0.1	0.1	0.3	0	0.3	0	0	0	31.7	0	31.7
6	23.3	2.7	1.9	1.9	0.4	0.4	0.1	0	0.1	0.1	0.3	0.7	0	0.7	0	0	0	29.5	0	29.5
3	7.3	0.7	0.3	0.3	0	0	0	0	0.1	0.1	0	0.3	0	0.3	0	0	0	8.8	0	8.8
-3	7.7	0.7	0.4	0.4	0.1	0.1	0.1	0	0	0	0	0.2	0	0.2	0	0	0	9.2	0	9.2
-6	22.2	2.7	1.3	1.3	0.5	0.5	0.1	0.1	0.1	0.1	0.4	1.3	0	1.3	0	0	0	28.8	0	28.8
-9	25.3	2.5	2.0	2.0	0.4	0.4	0.1	0.1	0.3	0.3	0.1	0.2	0	0.2	0	0	0	31.0	0	31.0
-12	14.8	1.6	0.7	0.7	0.2	0.2	0	0	0	0	0.1	0.3	0	0.3	0	0	0	17.7	0	17.7
-15	7.3	2.3	0.8	0.8	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	10.5	0	10.5
-20	1.3	1.0	0.3	0.3	0	0	0	0	0	0	0.1	0	0	0	0	0	0	2.7	0	2.7
-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT	119.38	108.04	108.72	77.17	83.30	110.42	266.52	742.54	3.15	1619.24										
FLIGHT MILES @ ALT	24014.89	29500.10	37757.94	31445.86	36596.71	52344.52	131369.93	363808.56	1545.14	708383.64										
TOTAL FLIGHTS																				914

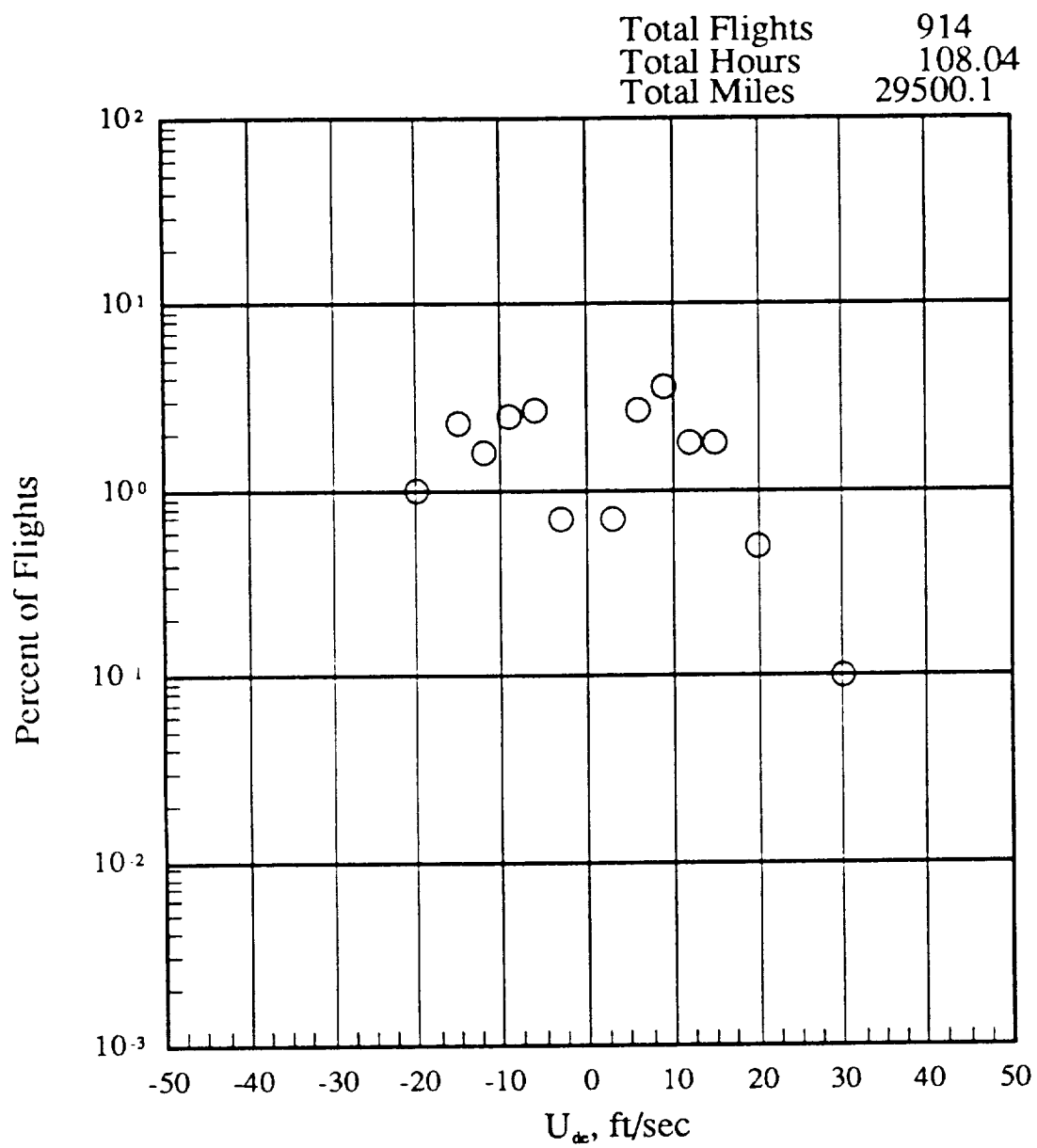
(a) Percent of flights where peak positive and negative U<sub>de</sub> per flight occurs within pressure altitude bands, any flap

Figure 19.- Peak positive and negative U<sub>de</sub> vs altitude.



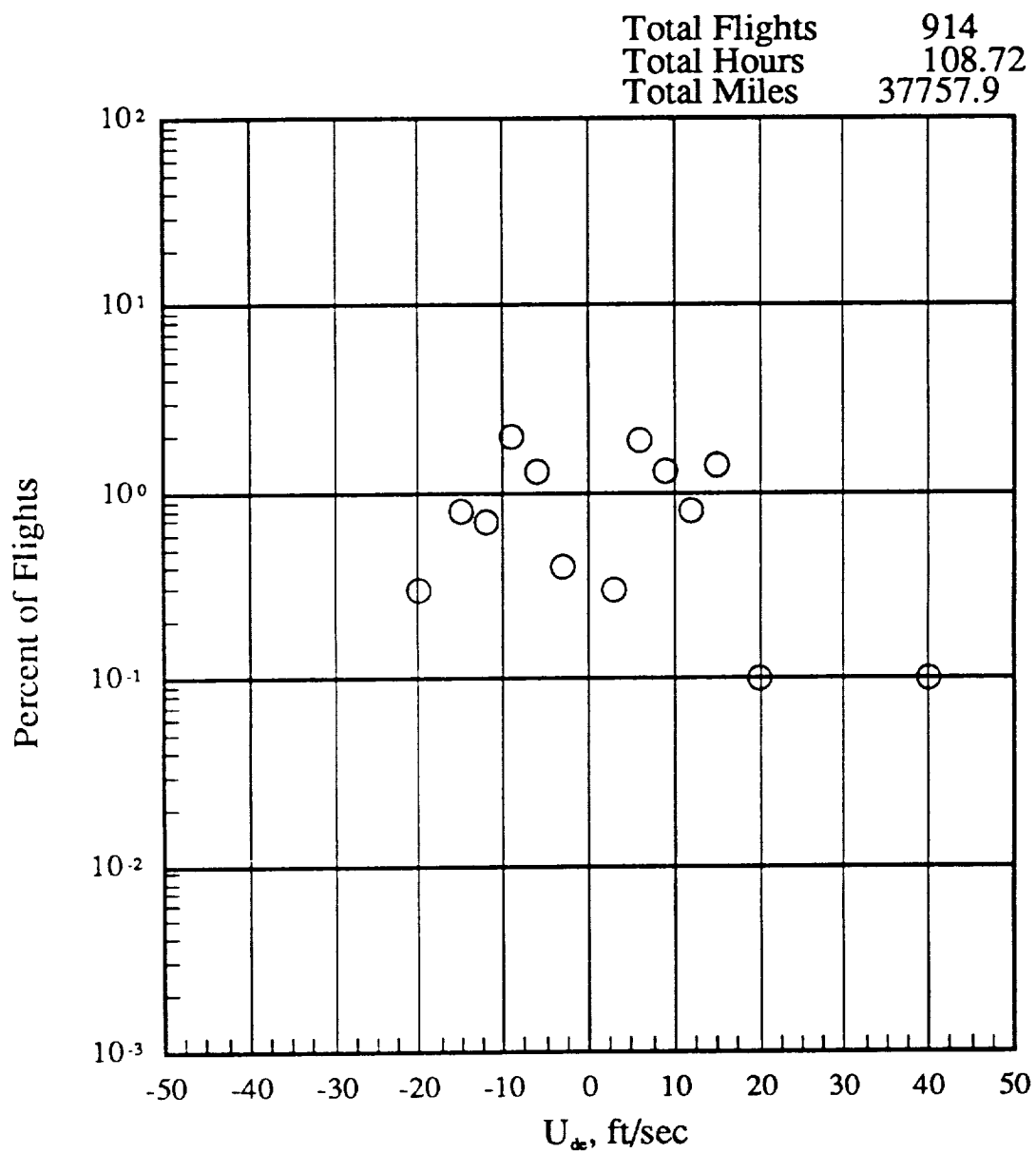
(b) -500 to 4500 feet altitude

Figure 19.- Continued.



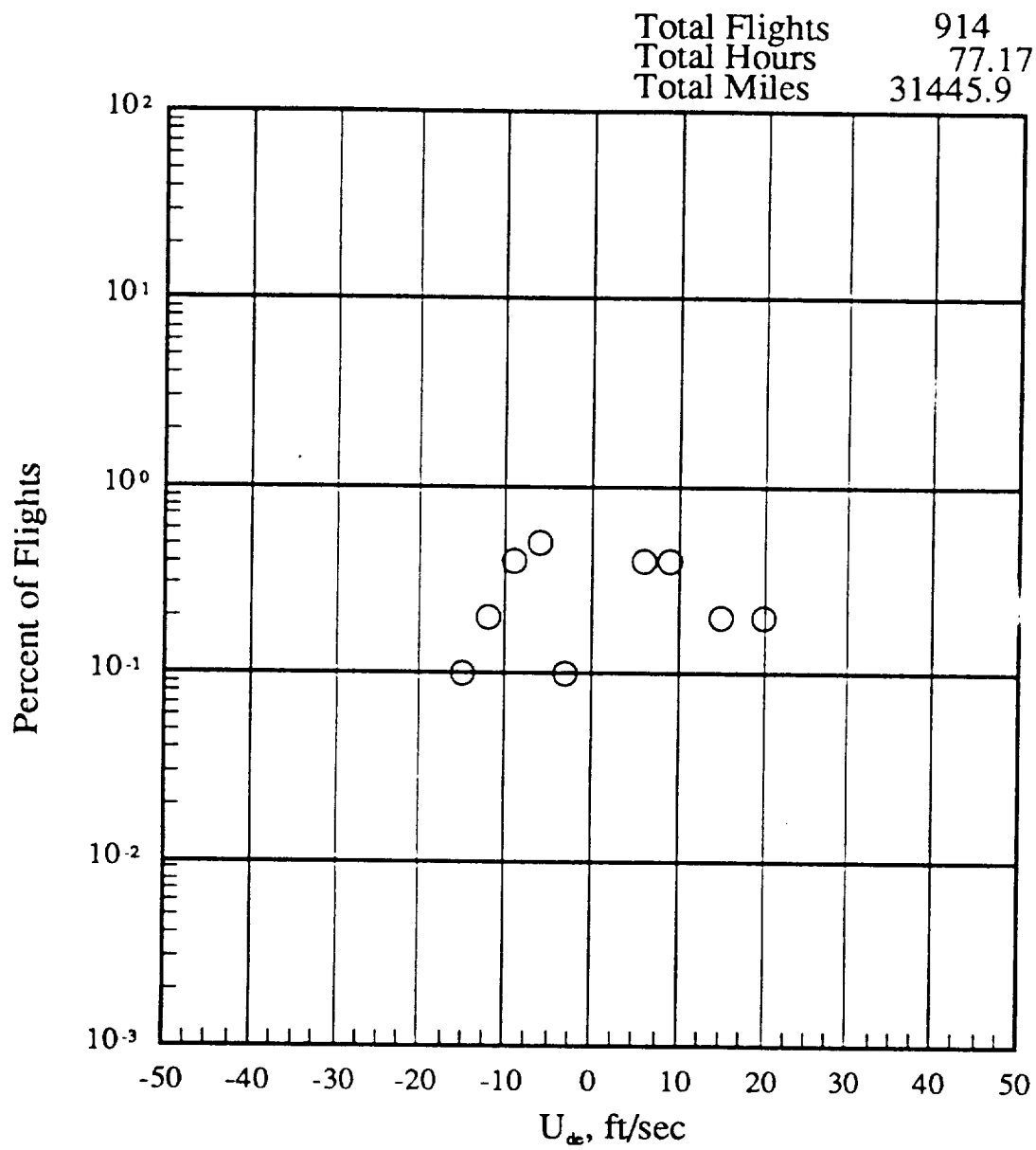
(c) 4500 to 9500 feet altitude

Figure 19.- Continued.



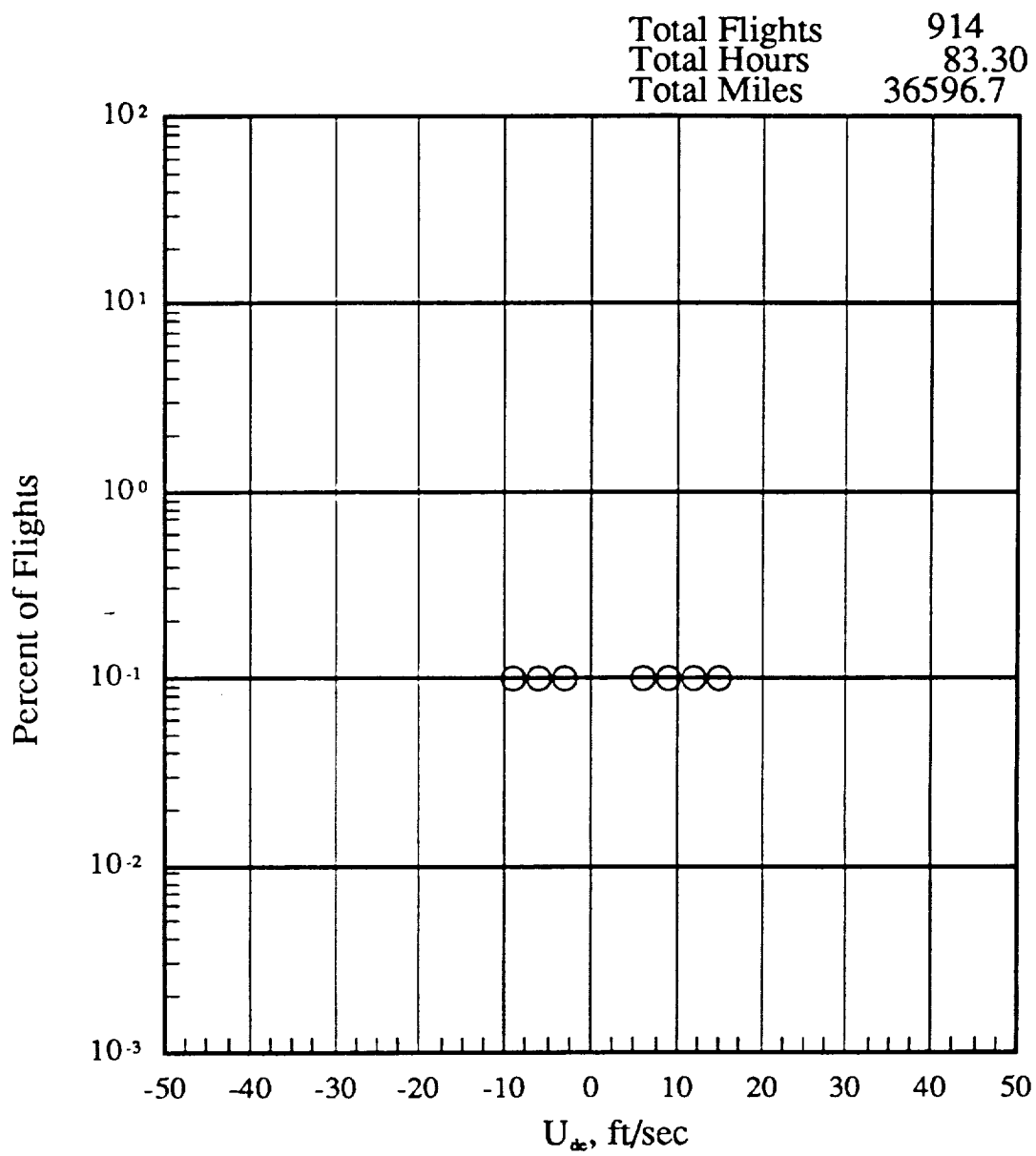
(d) 9500 to 14500 feet altitude

Figure 19.- Continued.



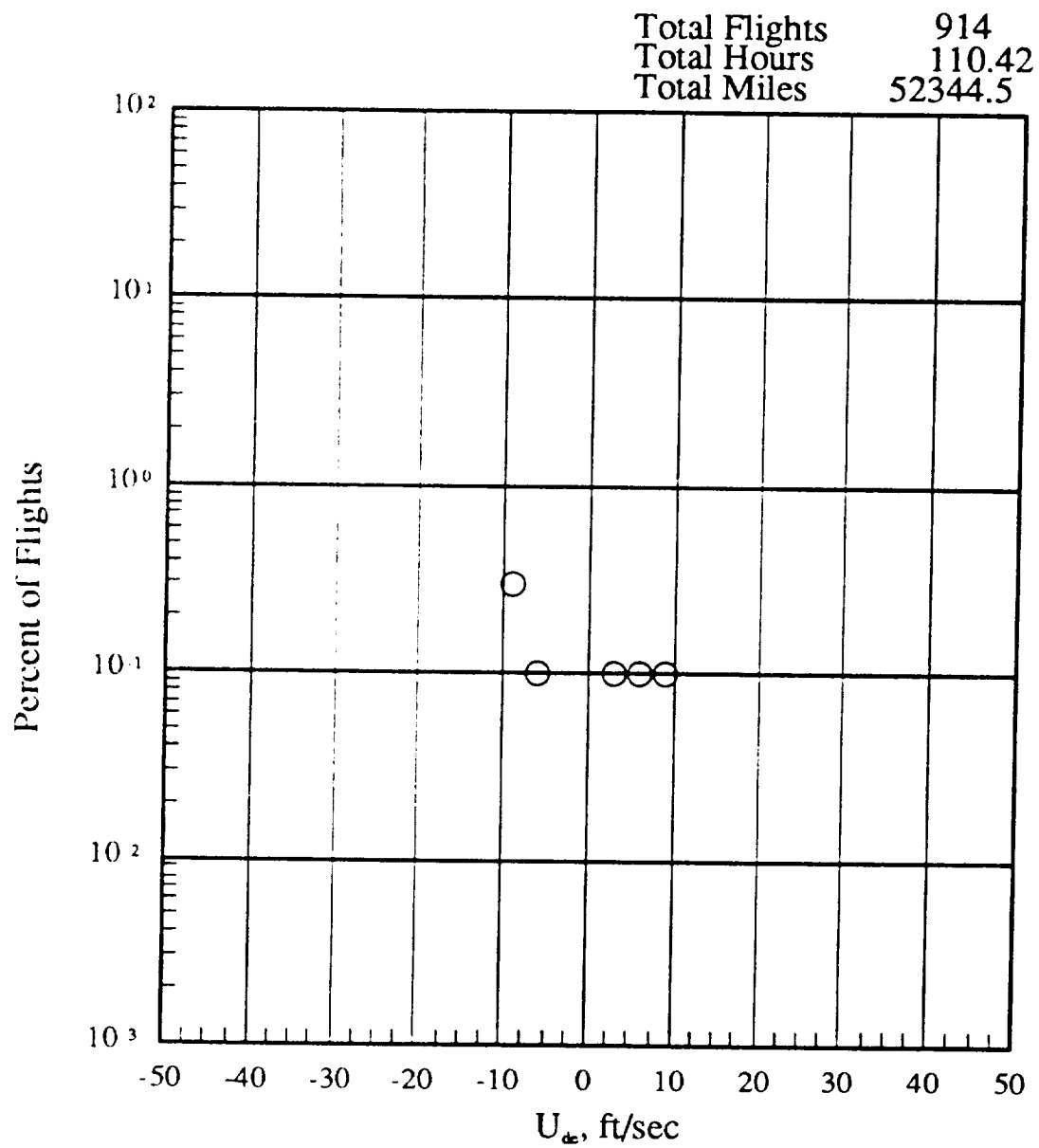
(e) 14500 to 19500 feet altitude

Figure 19.- Continued.



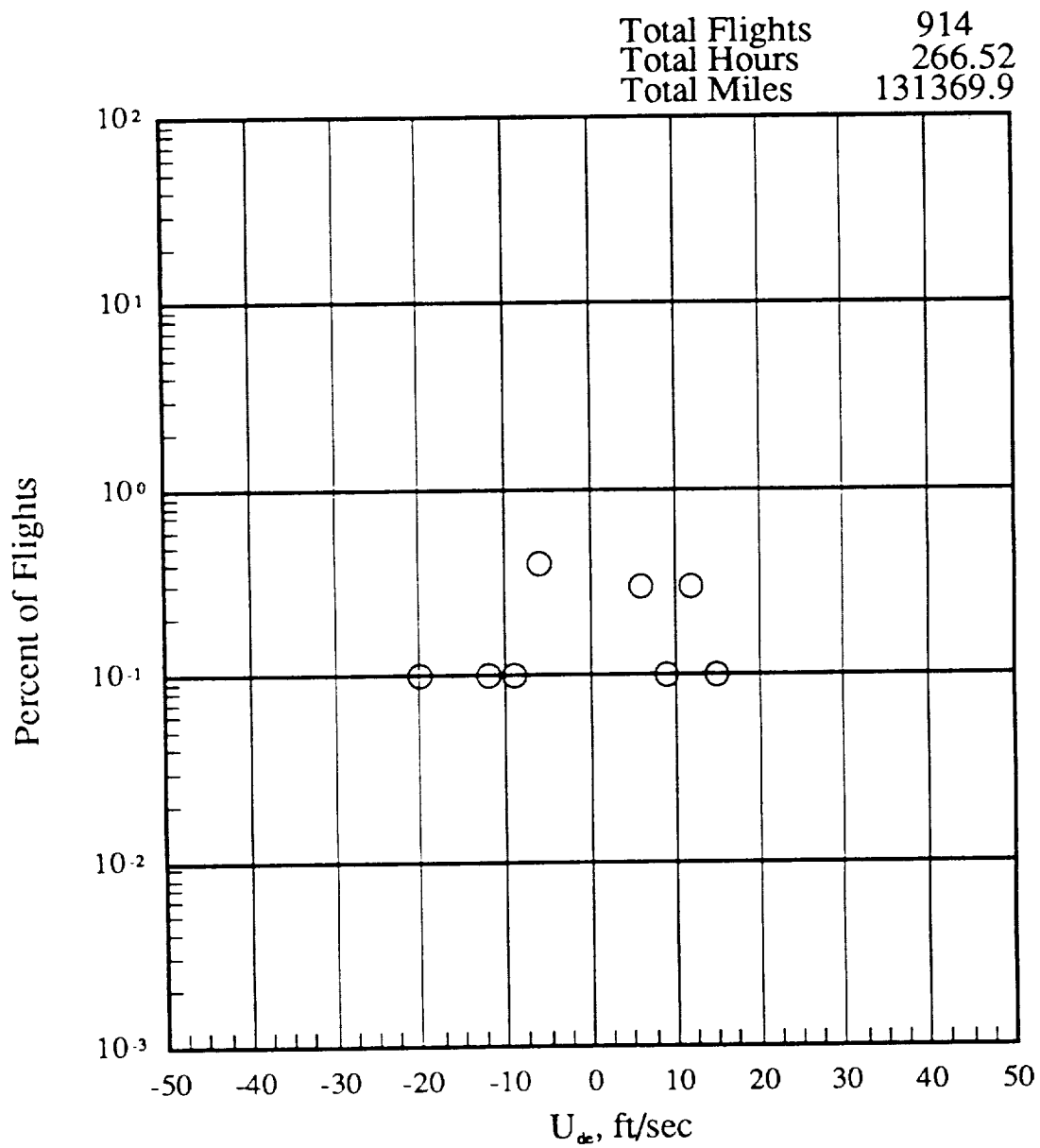
(f) 19500 to 24500 feet altitude

Figure 19.- Continued.



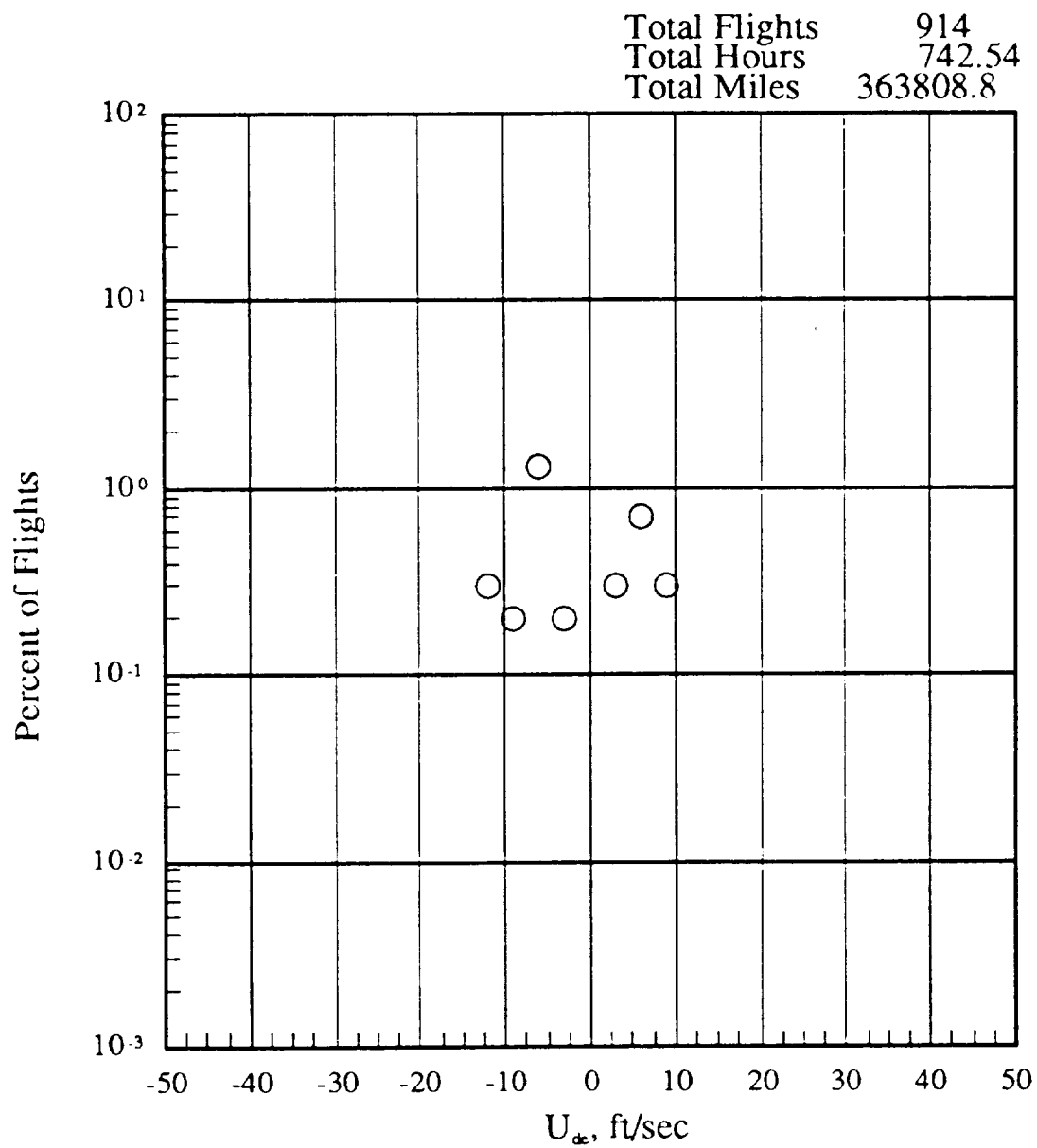
(g) 24500 to 29500 feet altitude

Figure 19.- Continued.



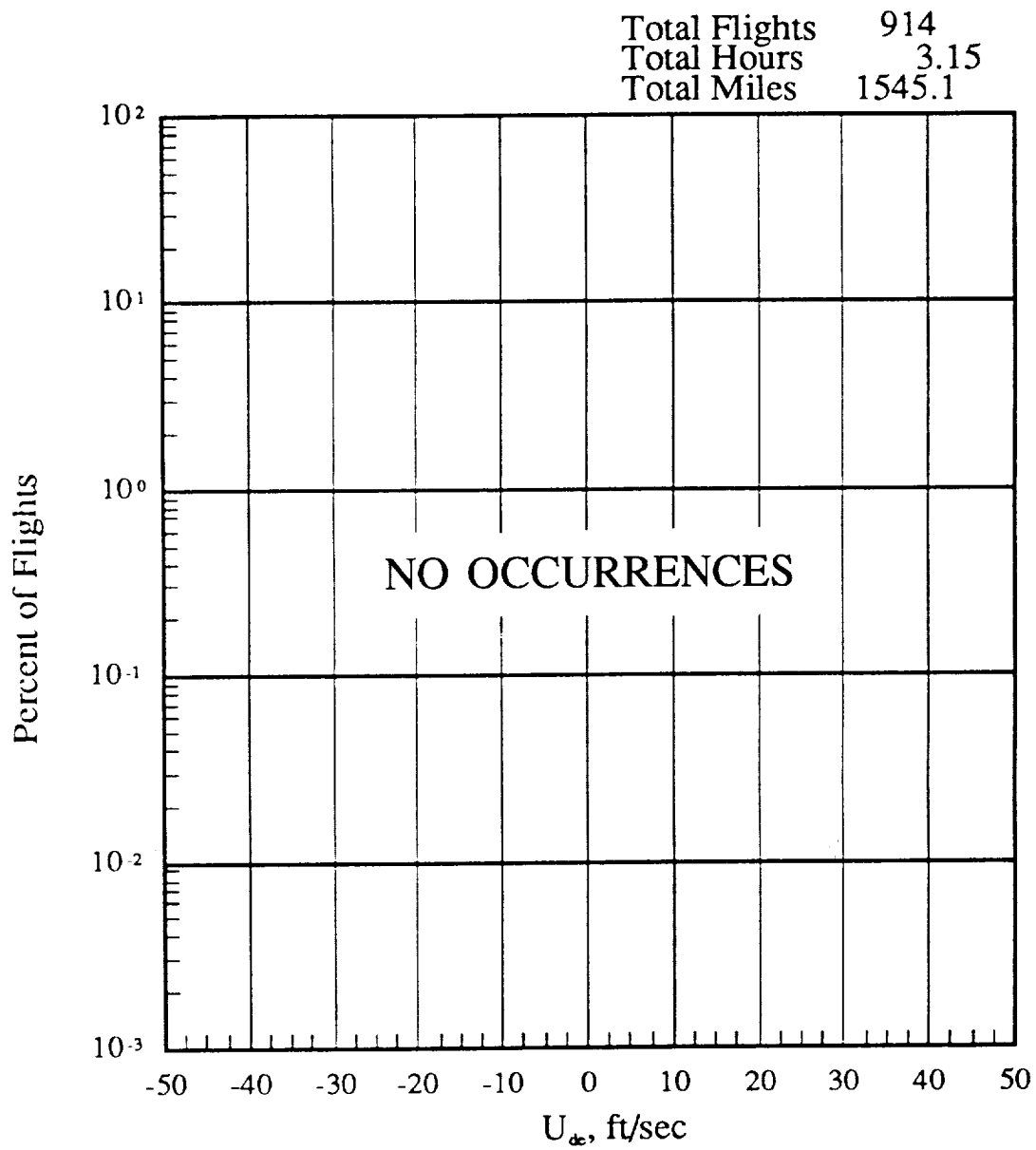
(h) 29500 to 34500 feet altitude

Figure 19.- Continued.



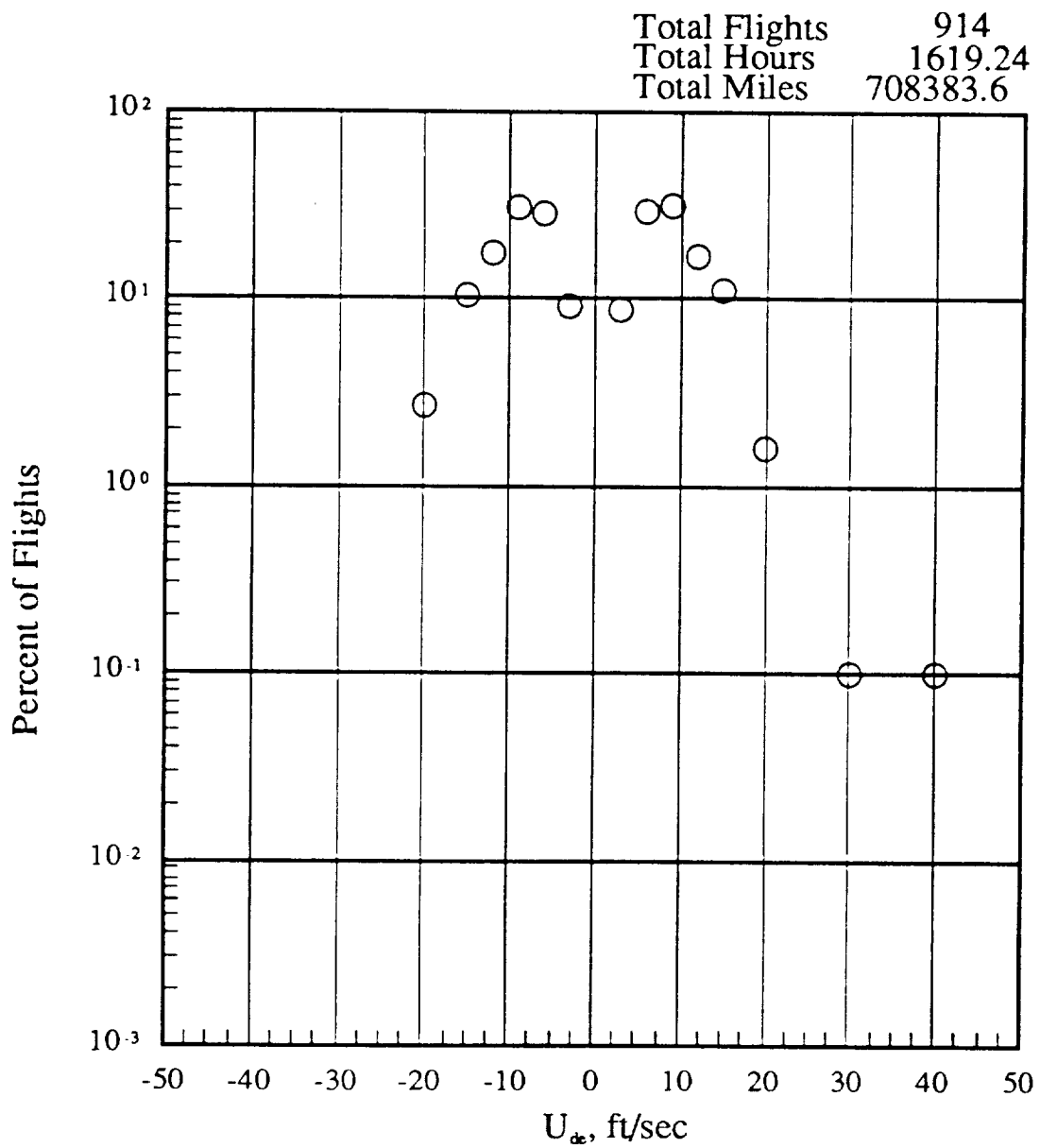
(i) 34500 to 39500 feet altitude

Figure 19.- Continued.



(j) 39500 to 44500 feet altitude

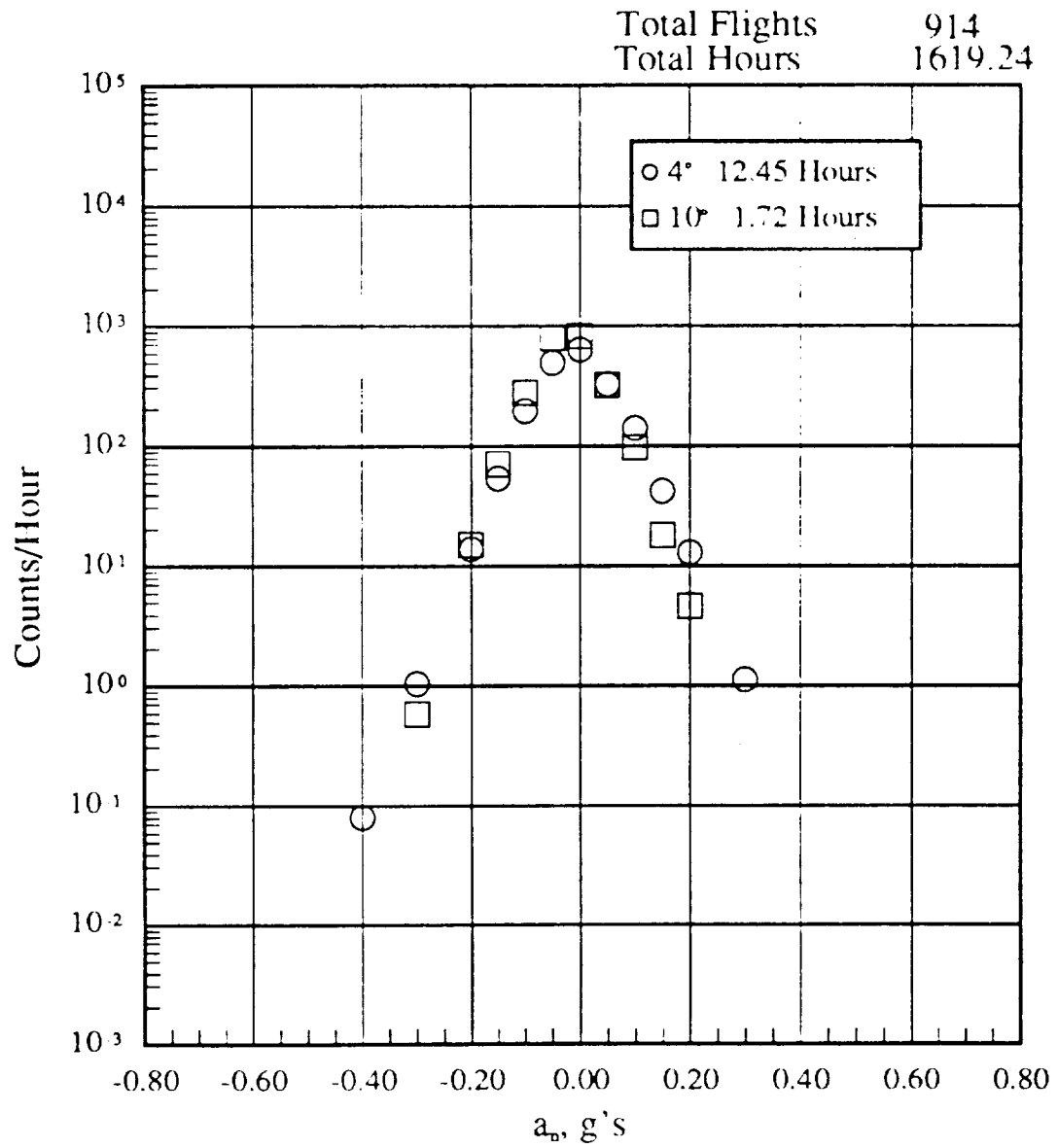
Figure 19.- Continued.



(k) -500 to 44500 feet altitude

Figure 19.- Concluded.





(b) Take off

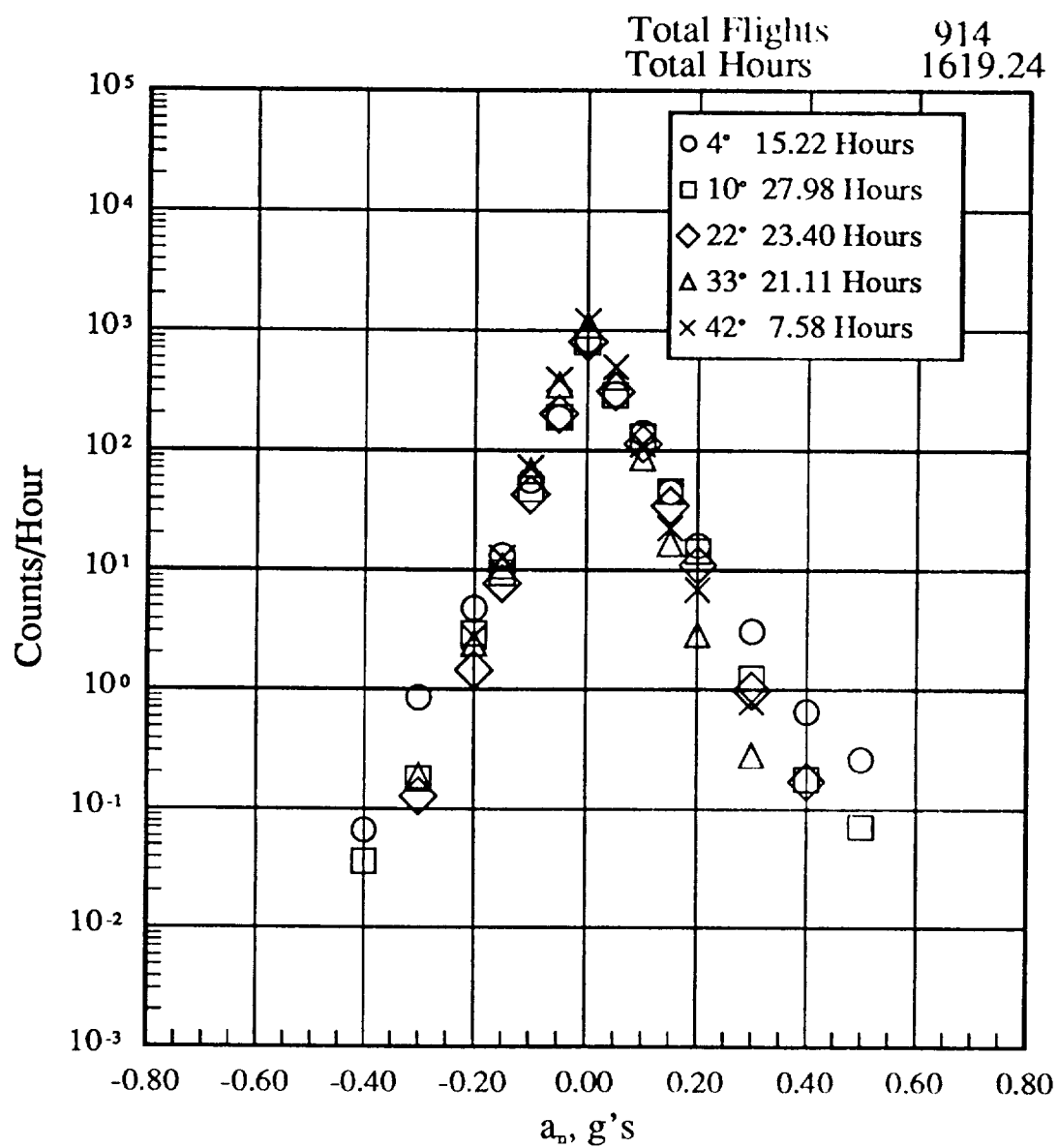
Figure 20.- Continued.

FLAP DETENT

a' n LEVEL g' s	4	10	18	22	27	33	42
1.60	0	0	0	0	0	0	0
1.40	0	0	0	0	0	0	0
1.20	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0
.80	0	0	0	0	0	0	0
.70	0	0	0	0	0	0	0
.60	0	0	0	0	0	0	0
.50	0.263	0.071	0	0	0	0	0
.40	0.657	0.179	0	0.171	0	0	0
.30	3.089	1.251	2.048	0.983	0	0.284	0.791
.20	16.034	14.332	15.971	11.028	9.943	2.889	6.856
.15	45.081	45.318	54.055	34.621	37.964	16.768	22.414
.10	140.039	130.522	167.899	113.695	137.393	86.918	112.466
.05	293.418	286.633	395.177	308.942	390.484	403.185	495.483
0	832.478	793.388	731.384	806.848	687.866	1109.944	1197.836
-.05	185.711	188.349	159.431	201.488	361.559	351.508	389.214
-.10	55.858	47.427	49.141	42.700	105.756	66.882	71.593
-.15	13.209	9.507	10.238	7.736	23.501	10.752	12.657
-.20	4.797	2.931	3.276	1.453	2.712	2.416	2.769
-.30	0.854	0.179	0.410	0.128	0	0.189	0
-.40	0.066	0.036	0	0	0	0	0
-.50	0	0	0	0	0	0	0
-.60	0	0	0	0	0	0	0
-.70	0	0	0	0	0	0	0
-.80	0	0	0	0	0	0	0
-1.00	0	0	0	0	0	0	0
-1.20	0	0	0	0	0	0	0
-1.40	0	0	0	0	0	0	0
-1.60	0	0	0	0	0	0	0
FLIGHT HOURS IN DETENT	15.217	27.980	2.442	23.396	1.106	21.112	7.585
			TOTAL HOURS				
			TOTAL FLIGHTS				98.84
			TOTAL FLIGHT HOURS FLAPS UP A				914
			TOTAL FLIGHT MILES FLAPS UP AND DOWN				1619.24
							708383.60

(c) Landing

Figure 20.- Continued.



(d) Landing.

Figure 20.- Concluded.



MAXIMUM AN LEVEL FOR EACH FLIGHT	G'S FROM TO	KAS																				TOTAL FLIGHTS INCLUDED	TOTAL FLIGHTS ANALYZED	TOTAL FLIGHT HOURS, ANY FLAP	TOTAL FLIGHT MILES, ANY FLAP
		120 TO 130 KTS	130 TO 140 KTS	140 TO 150 KTS	150 TO 160 KTS	160 TO 170 KTS	170 TO 180 KTS	180 TO 190 KTS	190 TO 200 KTS	200 TO 210 KTS	210 TO 220 KTS	220 TO 230 KTS	230 TO 240 KTS	240 TO 250 KTS	250 TO 260 KTS	260 TO 270 KTS	270 TO 280 KTS	280 TO 290 KTS	290 TO 300 KTS	300 TO 310 KTS	310 TO 320 KTS				
1.60	1.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	755 00	914 00	1619 24	708383 64
1.40	1.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.20	1.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.00	1.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.80	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.70	.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.60	.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.50	.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.40	.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.30	.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.20	.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.15	.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.10	.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.05	.10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.05	-.10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.10	-.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.15	-.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.20	-.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.30	-.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.40	-.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.50	-.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.60	-.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.70	-.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.80	-.90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-1.00	-1.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-1.20	-1.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-1.40	-1.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-1.60	-1.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL FLIGHTS & KAS		0	0	0	0	7	68	360	82	12	5	4	0	0	0	0	0	0	2	1	4	755 00	914 00	1619 24	708383 64
FLIGHT HOURS & KAS		0	0	0	0	0	0.2	0.7	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FLIGHT MILES & KAS		0	0	0	0	3	27	121	31	6	2	3	0	0	0	0	0	0	1	0	0	0	0	0	0

ORIGINAL PAGE IS  
OF POOR QUALITY

(b) Take off; flap 10 degree detent

Figure 21.- Continued.

MAXIMUM $\Delta_n$ LEVEL FOR EACH FLIGHT : G's FROM T <sub>0</sub>																							EAS, KTS										TOTAL FLIGHTS INCLUDED				
130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320																		
1.60	1.80																																				
1.40	1.60																																				
1.20	1.40																																				
1.00	1.20																																				
.80	1.00																																				
.70	0.80																																				
.60	0.70																																				
.50	0.60																																				
.40	0.50																																				
.30	0.40																																				
.20	0.30																																				
.15	0.20																																				
.10	0.15																																				
.05	0.10																																				
-.05	-0.10																																				
-.10	-0.15																																				
-.15	-0.20																																				
-.20	-0.30																																				
-.30	-0.40																																				
-.40	-0.50																																				
-.50	-0.60																																				
-.60	-0.70																																				
-.70	-0.80																																				
-.80	-1.00																																				
-1.00	-1.20																																				
-1.20	-1.40																																				
-1.40	-1.60																																				
-1.60	-1.80																																				
TOTAL PEAK $\Delta_n$ EAS																							TOTAL FLIGHTS INCLUDED					5									
FLIGHT HOURS $\Delta_n$ EAS																							TOTAL FLIGHTS ANALYZED					914									
FLIGHT MILES $\Delta_n$ EAS																							TOTAL FLIGHT HOURS , ANY FLAP					16,224									
																							TOTAL FLIGHT MILES , ANY FLAP					7083									

(c) Take off; flap 18 degree detent

ORIGINAL PAGE IS  
OF POOR QUALITY

Figure 21.- Continued.







MAXIMUM $\alpha_n$ LEVEL FOR EACH FLIGHT		TO		FROM		MAS, KTS		200		190		180		170		160		150		140		130		120		110		100		90		80		70		60		50		40		30		20		10		0		-10		-20		-30		-40		-50		-60		-70		-80		-90		-100		-110		-120		-130		-140		-150		-160		-170		-180		-190		-200		-210		-220		-230		-240		-250		-260		-270		-280		-290		-300		-310		-320		-330		-340		-350		-360		-370		-380		-390		-400		-410		-420		-430		-440		-450		-460		-470		-480		-490		-500		-510		-520		-530		-540		-550		-560		-570		-580		-590		-600		-610		-620		-630		-640		-650		-660		-670		-680		-690		-700		-710		-720		-730		-740		-750		-760		-770		-780		-790		-800		-810		-820		-830		-840		-850		-860		-870		-880		-890		-900		-910		-920		-930		-940		-950		-960		-970		-980		-990		-1000		-1010		-1020		-1030		-1040		-1050		-1060		-1070		-1080		-1090		-1100		-1110		-1120		-1130		-1140		-1150		-1160		-1170		-1180		-1190		-1200		-1210		-1220		-1230		-1240		-1250		-1260		-1270		-1280		-1290		-1300		-1310		-1320		-1330		-1340		-1350		-1360		-1370		-1380		-1390		-1400		-1410		-1420		-1430		-1440		-1450		-1460		-1470		-1480		-1490		-1500		-1510		-1520		-1530		-1540		-1550		-1560		-1570		-1580		-1590		-1600		-1610		-1620		-1630		-1640		-1650		-1660		-1670		-1680		-1690		-1700		-1710		-1720		-1730		-1740		-1750		-1760		-1770		-1780		-1790		-1800		-1810		-1820		-1830		-1840		-1850		-1860		-1870		-1880		-1890		-1900		-1910		-1920		-1930		-1940		-1950		-1960		-1970		-1980		-1990		-2000		-2010		-2020		-2030		-2040		-2050		-2060		-2070		-2080		-2090		-2100		-2110		-2120		-2130		-2140		-2150		-2160		-2170		-2180		-2190		-2200		-2210		-2220		-2230		-2240		-2250		-2260		-2270		-2280		-2290		-2300		-2310		-2320		-2330		-2340		-2350		-2360		-2370		-2380		-2390		-2400		-2410		-2420		-2430		-2440		-2450		-2460		-2470		-2480		-2490		-2500		-2510		-2520		-2530		-2540		-2550		-2560		-2570		-2580		-2590		-2600		-2610		-2620		-2630		-2640		-2650		-2660		-2670		-2680		-2690		-2700		-2710		-2720		-2730		-2740		-2750		-2760		-2770		-2780		-2790		-2800		-2810		-2820		-2830		-2840		-2850		-2860		-2870		-2880		-2890		-2900		-2910		-2920		-2930		-2940		-2950		-2960		-2970		-2980		-2990		-3000		-3010		-3020		-3030		-3040		-3050		-3060		-3070		-3080		-3090		-3100		-3110		-3120		-3130		-3140		-3150		-3160		-3170		-3180		-3190		-3200		-3210		-3220		-3230		-3240		-3250		-3260		-3270		-3280		-3290		-3300		-3310		-3320		-3330		-3340		-3350		-3360		-3370		-3380		-3390		-3400		-3410		-3420		-3430		-3440		-3450		-3460		-3470		-3480		-3490		-3500		-3510		-3520		-3530		-3540		-3550		-3560		-3570		-3580		-3590		-3600		-3610		-3620		-3630		-3640		-3650		-3660		-3670		-3680		-3690		-3700		-3710		-3720		-3730		-3740		-3750		-3760		-3770		-3780		-3790		-3800		-3810		-3820		-3830		-3840		-3850		-3860		-3870		-3880		-3890		-3900		-3910		-3920		-3930		-3940		-3950		-3960		-3970		-3980		-3990		-4000		-4010		-4020		-4030		-4040		-4050		-4060		-4070		-4080		-4090		-4100		-4110		-4120		-4130		-4140		-4150		-4160		-4170		-4180		-4190		-4200		-4210		-4220		-4230		-4240		-4250		-4260		-4270		-4280		-4290		-4300		-4310		-4320		-4330		-4340		-4350		-4360		-4370		-4380		-4390		-4400		-4410		-4420		-4430		-4440		-4450		-4460		-4470		-4480		-4490		-4500		-4510		-4520		-4530		-4540		-4550		-4560		-4570		-4580		-4590		-4600		-4610		-4620		-4630		-4640		-4650		-4660		-4670		-4680		-4690		-4700		-4710		-4720		-4730		-4740		-4750		-4760		-4770		-4780		-4790		-4800		-4810		-4820		-4830		-4840		-4850		-4860		-4870		-4880		-4890		-4900		-4910		-4920		-4930		-4940		-4950		-4960		-4970		-4980		-4990		-5000		-5010		-5020		-5030		-5040		-5050		-5060		-5070		-5080		-5090		-5100		-5110		-5120		-5130		-5140		-5150		-5160		-5170		-5180		-5190		-5200		-5210		-5220		-5230		-5240		-5250		-5260		-5270		-5280		-5290		-5300		-5310		-5320		-5330		-5340		-5350		-5360		-5370		-5380		-5390		-5400		-5410		-5420		-5430		-5440		-5450		-5460		-5470		-5480		-5490		-5500		-5510		-5520		-5530		-5540		-5550		-5560		-5570		-5580		-5590		-5600		-5610		-5620		-5630		-5640		-5650		-5660		-5670		-5680		-5690		-5700		-5710		-5720		-5730		-5740		-5750		-5760		-5770		-5780		-5790		-5800		-5810		-5820		-5830		-5840		-5850		-5860		-5870		-5880		-5890		-5900		-5910		-5920		-5930		-5940		-5950		-5960		-5970		-5980		-5990		-6000		-6010		-6020		-6030		-6040		-6050		-6060		-6070		-6080		-6090		-6100		-6110		-6120		-6130		-6140		-6150		-6160		-6170		-6180		-6190		-6200		-6210		-6220		-6230		-6240		-6250		-6260		-6270		-6280		-6290		-6300		-6310		-6320		-6330		-6340		-6350		-6360		-6370		-6380		-6390		-6400		-6410		-6420		-6430		-6440		-6450		-6460		-6470		-6480		-6490		-6500		-6510		-6520		-6530		-6540		-6550		-6560		-6570		-6580		-6590		-6600		-6610		-6620		-6630		-6640		-6650		-6660		-6670		-6680		-6690		-6700		-6710		-6720		-6730		-6740		-6750		-6760		-6770		-6780		-6790		-6800		-6810		-6820		-6830		-6840		-6850		-6860		-6870		-6880		-6890		-6900		-6910		-6920		-6930		-6940		-6950		-6960		-6970		-6980		-6990		-7000		-7010		-7020		-7030		-7040		-7050		-7060		-7070		-7080		-7090		-7100		-7110		-7120		-7130		-7140		-7150		-716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MAXIMUM $\Delta_n$ LEVEL FOR EACH FLIGHT		HAS, KTS																								TOTAL FLIGHTS INCLUDED		907																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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PRESSURE ALTITUDE BANDS												
$a_n$	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT		
LEVEL												
$g' s$												
1.60	0	0	0	0	0	0	0	0	0	0		
1.40	0	0	0	0	0	0	0	0	0	0		
1.20	0	0	0	0	0	0	0	0	0	0		
1.00	0	0	0	0	0	0	0	0	0	0		
.80	0	0	0	0	0	0	0	0	0	0		
.70	0	0	0	0	0	0	0	0	0	0		
.60	0	0	0	0	0	0	0	0	0	0		
.50	0.11	0	0	0	0	0	0	0	0	0.04		
.40	0.77	0	0.45	0.52	0	0	0	0	0	0.38		
.30	2.21	1.92	1.79	1.03	2.50	0	0	0	0	1.48		
.20	22.76	9.59	11.16	2.58	9.99	0	4.73	0	0	11.89		
.15	57.00	20.56	27.23	5.16	27.48	0	9.45	1.38	0	29.27		
.10	159.96	74.29	84.38	25.27	51.21	13.42	33.09	15.85	0	87.69		
.05	335.94	130.22	226.36	95.92	146.15	148.56	115.01	101.68	12.42	205.29		
0.00	752.41	1248.16	888.03	1006.10	954.34	1095.53	951.60	1489.98	696.26	976.33		
-.05	272.09	111.85	144.66	81.48	178.63	98.72	143.37	117.19	14.49	170.87		
-.10	88.93	33.72	45.09	17.02	27.48	5.75	17.33	14.13	0	48.17		
-.15	25.08	8.50	12.50	2.58	2.50	0	3.15	1.72	0	12.65		
-.20	6.63	3.56	5.36	1.55	1.25	0	1.58	0.34	0	3.84		
-.30	0.33	0.27	1.34	0.52	0	0	1.58	0	0	0.38		
-.40	0	0	0	0	0	0	0	0	0	0		
-.50	0	0	0	0	0	0	0	0	0	0		
-.60	0	0	0	0	0	0	0	0	0	0		
-.70	0	0	0	0	0	0	0	0	0	0		
-.80	0	0	0	0	0	0	0	0	0	0		
-1.00	0	0	0	0	0	0	0	0	0	0		
-1.20	0	0	0	0	0	0	0	0	0	0		
-1.40	0	0	0	0	0	0	0	0	0	0		
-1.60	0	0	0	0	0	0	0	0	0	0		
FLIGHT HOURS @ ALT	9.05	3.65	2.24	1.94	0.80	1.04	0.63	2.90	1.45	23.71		
FLIGHT MILES @ ALT	1758.01	966.39	794.83	793.19	358.67	505.83	309.94	1419.36	710.03	7616.26		
TOTAL FLIGHTS										56		
TOTAL FLIGHT HOURS FLAPS UP AND DOWN										23.71		
TOTAL FLIGHT MILES FLAPS UP AND DOWN										7616.26		

(a)  $a_n$  Level crossing counts per hour within pressure altitude bands

Figure 22.- Normal acceleration exceedances: Non-revenue flights.

## PRESSURE ALTITUDE BANDS

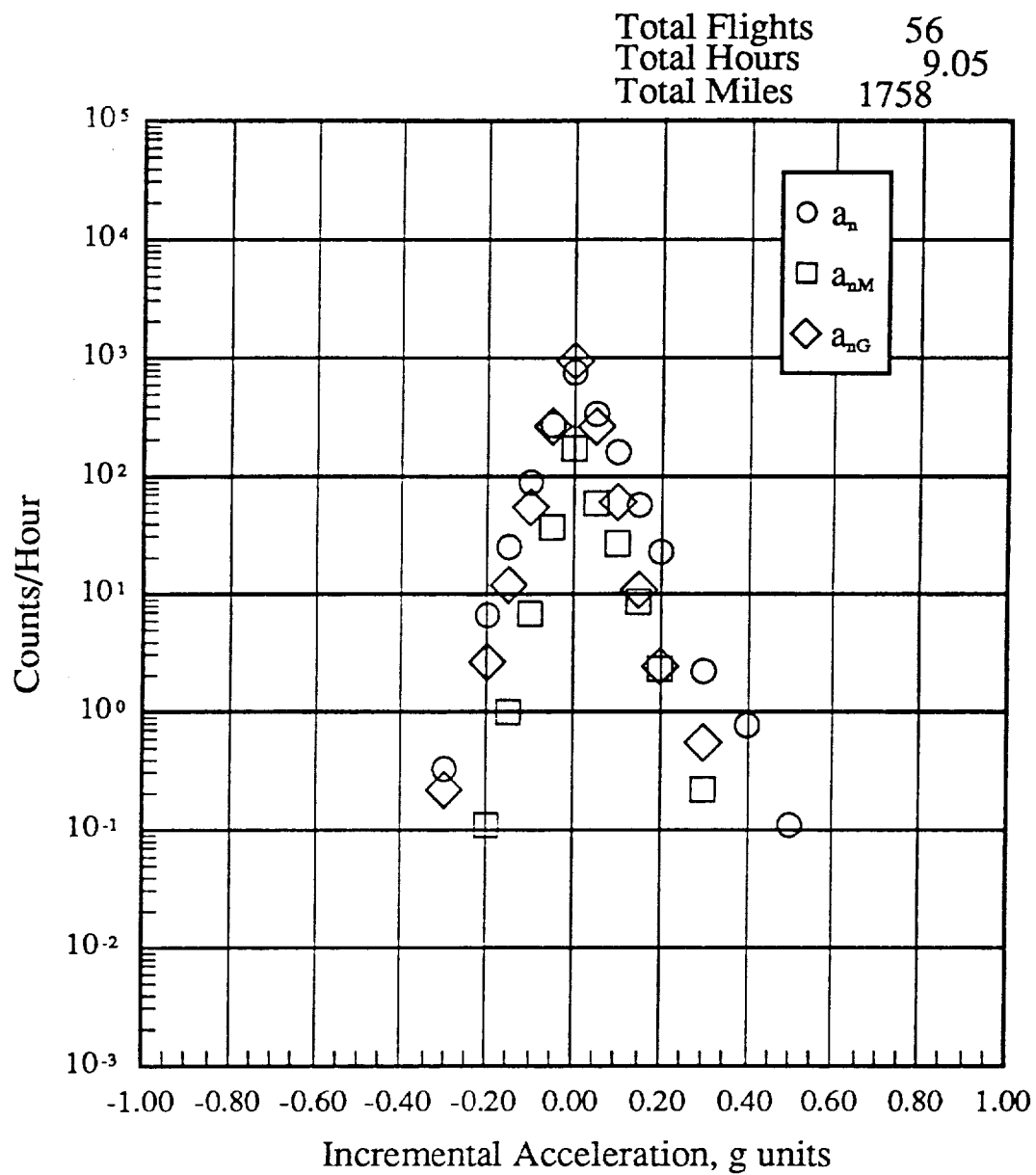
[illegible]

(b)  $a_{\text{M}}$  Level crossing counts per hour within pressure altitude bands

PRESSURE ALTITUDE BANDS

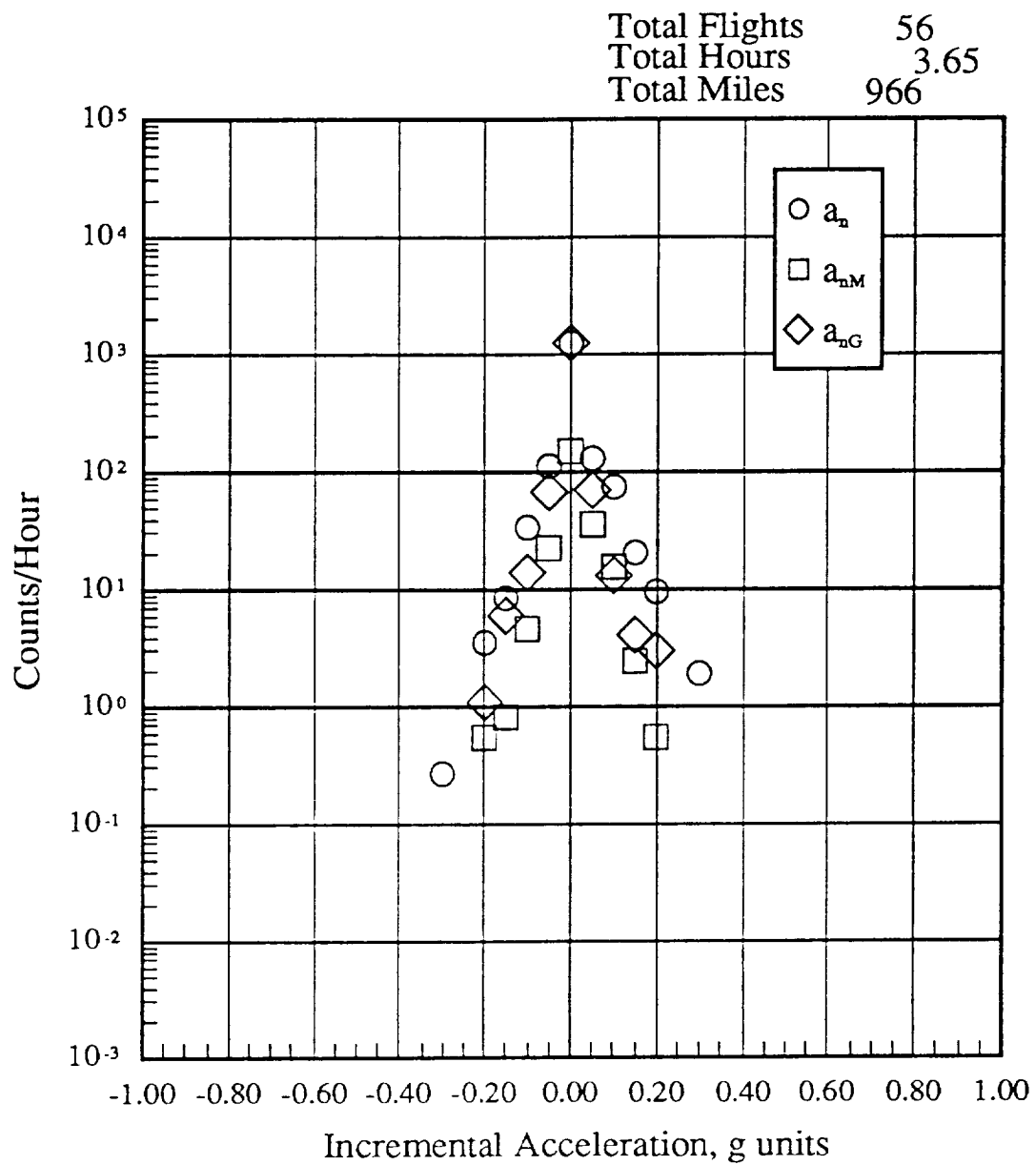
$a_{hg}$	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
LEVEL										
$g' s$										
1.60	0	0	0	0	0	0	0	0	0	0
1.40	0	0	0	0	0	0	0	0	0	0
1.20	0	0	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0	0	0
.80	0	0	0	0	0	0	0	0	0	0
.70	0	0	0	0	0	0	0	0	0	0
.60	0	0	0	0	0	0	0	0	0	0
.50	0	0	0	0	0	0	0	0	0	0
.40	0	0	0	0	0	0	0	0	0	0.04
.30	0.55	0	0.45	0	0	0	0	0	0	0.34
.20	2.43	3.02	3.13	0.52	0	0	3.15	0	0	1.81
.15	10.83	4.11	7.59	1.03	1.25	0	4.73	1.03	0	5.86
.10	60.32	13.16	18.75	5.16	9.99	2.88	14.18	4.48	0	28.64
.05	262.92	69.91	99.56	29.39	68.70	23.00	40.96	55.84	0	134.22
0.00	938.44	1256.66	1288.96	1466.61	1366.55	1478.91	1350.20	1416.56	1419.44	1200.90
-.05	263.47	67.44	100.01	28.36	81.19	24.92	39.39	53.77	0.69	134.26
-.10	54.57	13.98	28.13	3.61	8.74	2.88	9.45	5.17	0	27.25
-.15	11.93	6.03	8.93	1.03	1.25	0	4.73	0.34	0	6.62
-.20	2.65	1.10	2.68	0.52	0	0	0	0	0	1.48
-.30	0.22	0	0.89	0.52	0	0	0	0	0	0.21
-.40	0	0	0	0	0	0	0	0	0	0
-.50	0	0	0	0	0	0	0	0	0	0
-.60	0	0	0	0	0	0	0	0	0	0
-.70	0	0	0	0	0	0	0	0	0	0
-.80	0	0	0	0	0	0	0	0	0	0
-1.00	0	0	0	0	0	0	0	0	0	0
-1.20	0	0	0	0	0	0	0	0	0	0
-1.40	0	0	0	0	0	0	0	0	0	0
-1.60	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT	9.05	3.65	2.24	1.94	0.80	1.04	0.63	2.90	1.45	23.71
FLIGHT MILES @ ALT	1758.01	966.39	794.83	793.19	358.67	505.83	309.94	1419.36	710.03	7616.26
TOTAL FLIGHTS										56
TOTAL FLIGHT HOURS FLAPS UP AND DOWN										23.71
TOTAL FLIGHT MILES FLAPS UP AND DOWN										7616.26

(c)  $a_{hg}$  Level crossing counts per hour within pressure altitude bands



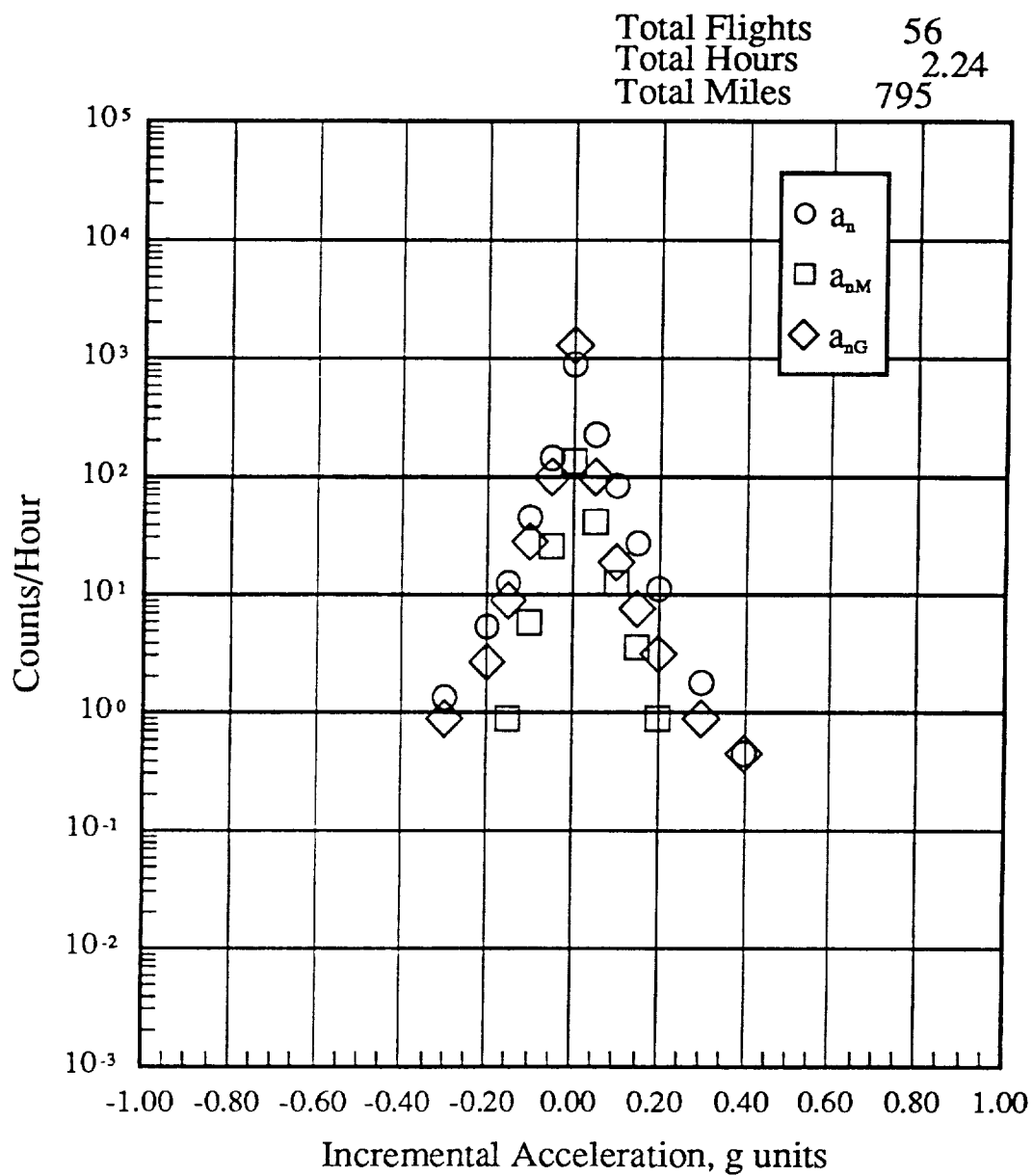
(d)  $a_n$ ,  $a_{nM}$ ,  $a_{nG}$ , -500 to 4500 feet altitude

Figure 22.- Continued.



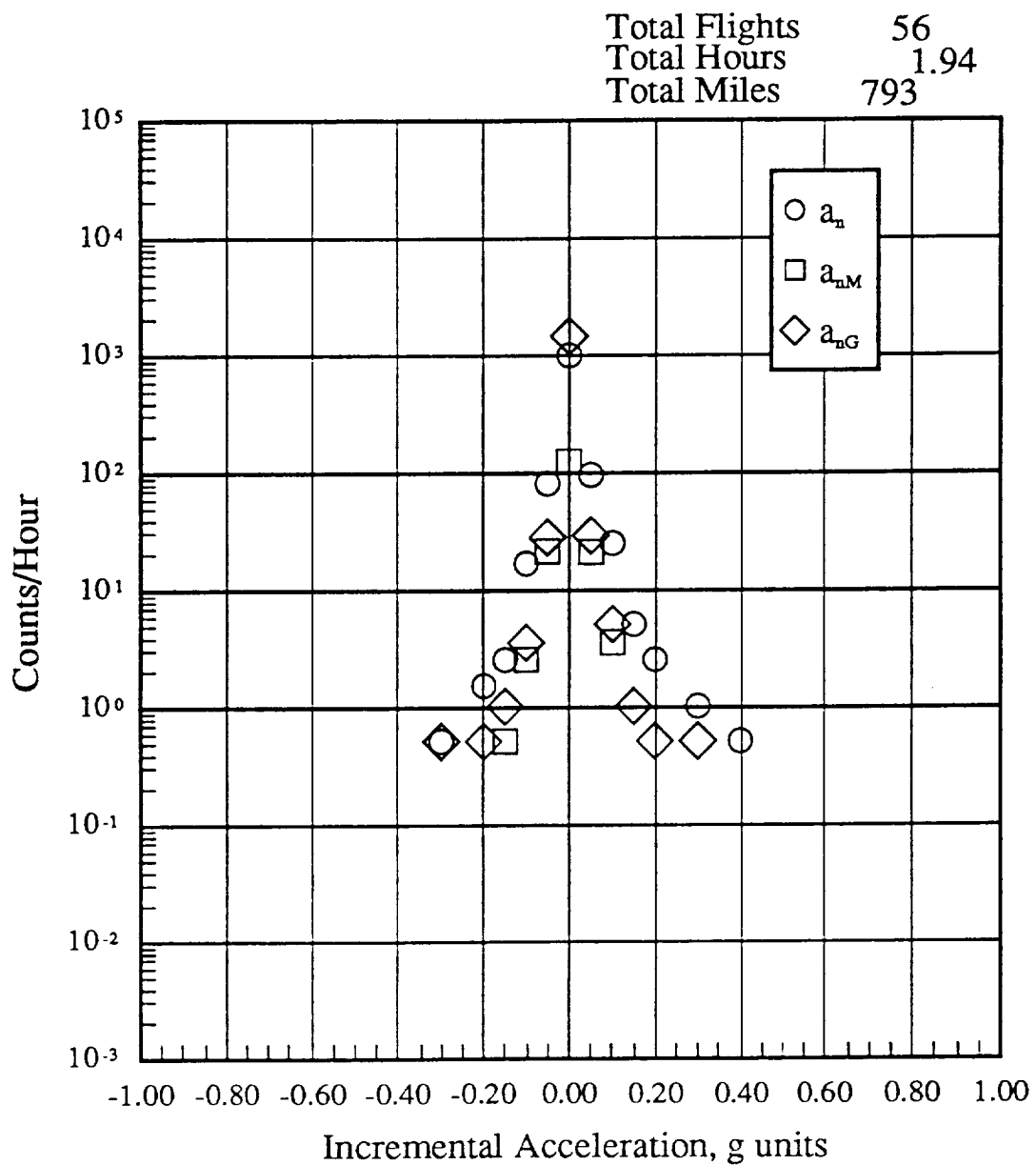
(e)  $a_n$ ,  $a_{nM}$ ,  $a_{nG}$ , 4500 to 9500 feet altitude

Figure 22.- Continued.



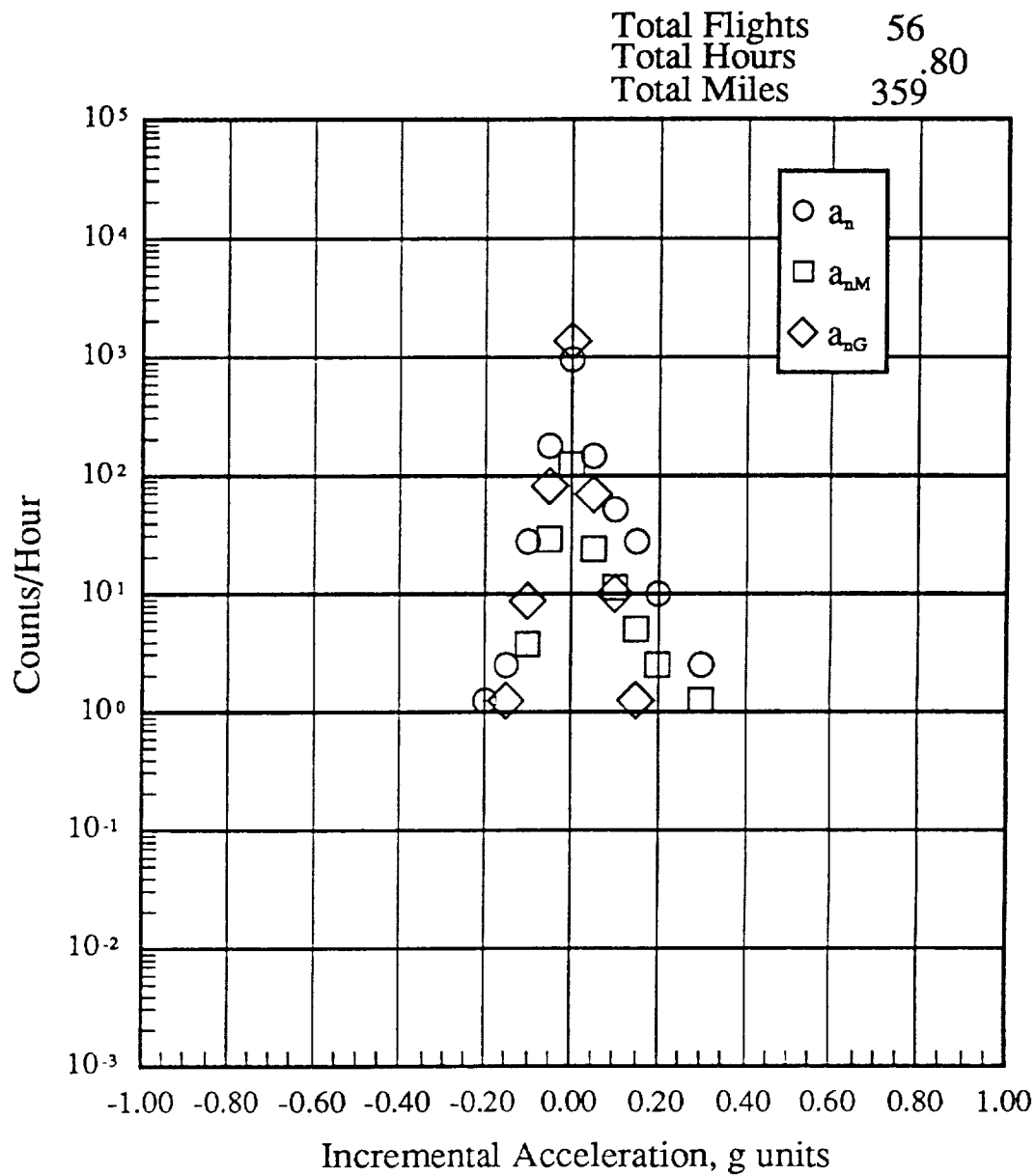
(f)  $a_n$ ,  $a_{nM}$ ,  $a_{nG}$ , 9500 to 14500 feet altitude

Figure 22.- Continued.



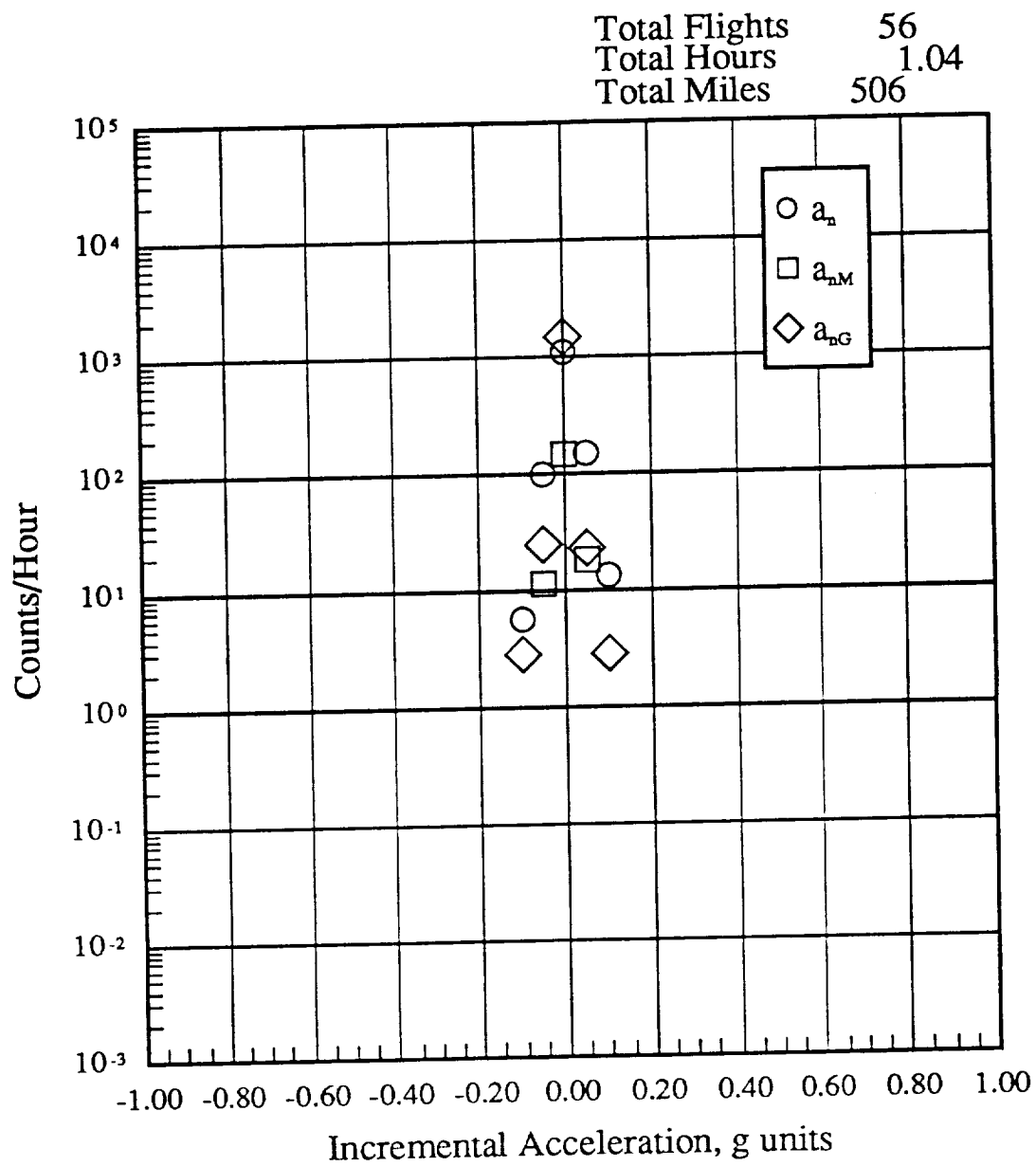
(g)  $a_n$ ,  $a_{nM}$ ,  $a_{nG}$ , 14500 to 19500 feet altitude

Figure 22.- Continued.



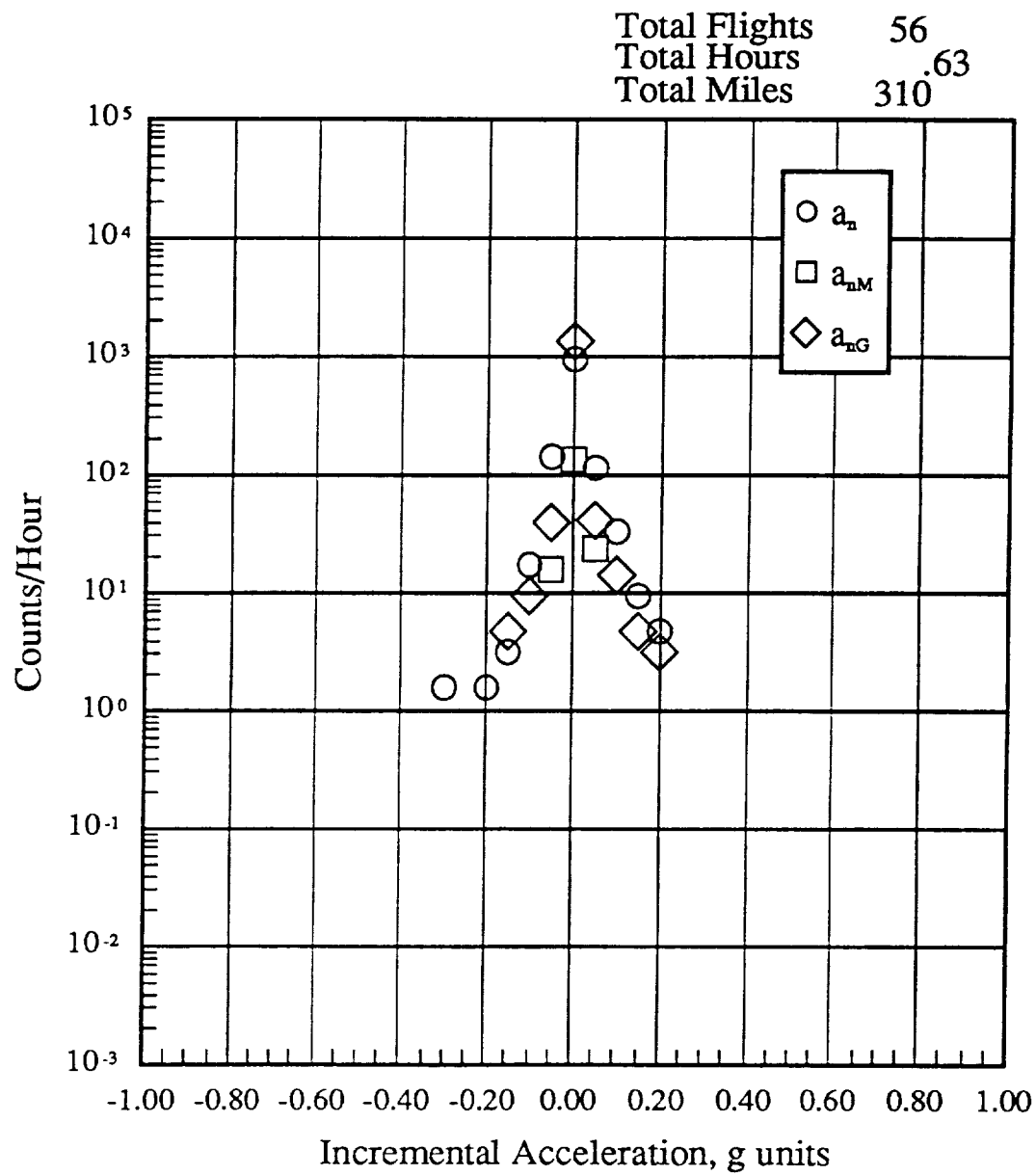
(h)  $a_n$ ,  $a_{nM}$ ,  $a_{nG}$ , 19500 to 24500 feet altitude

Figure 22.- Continued.



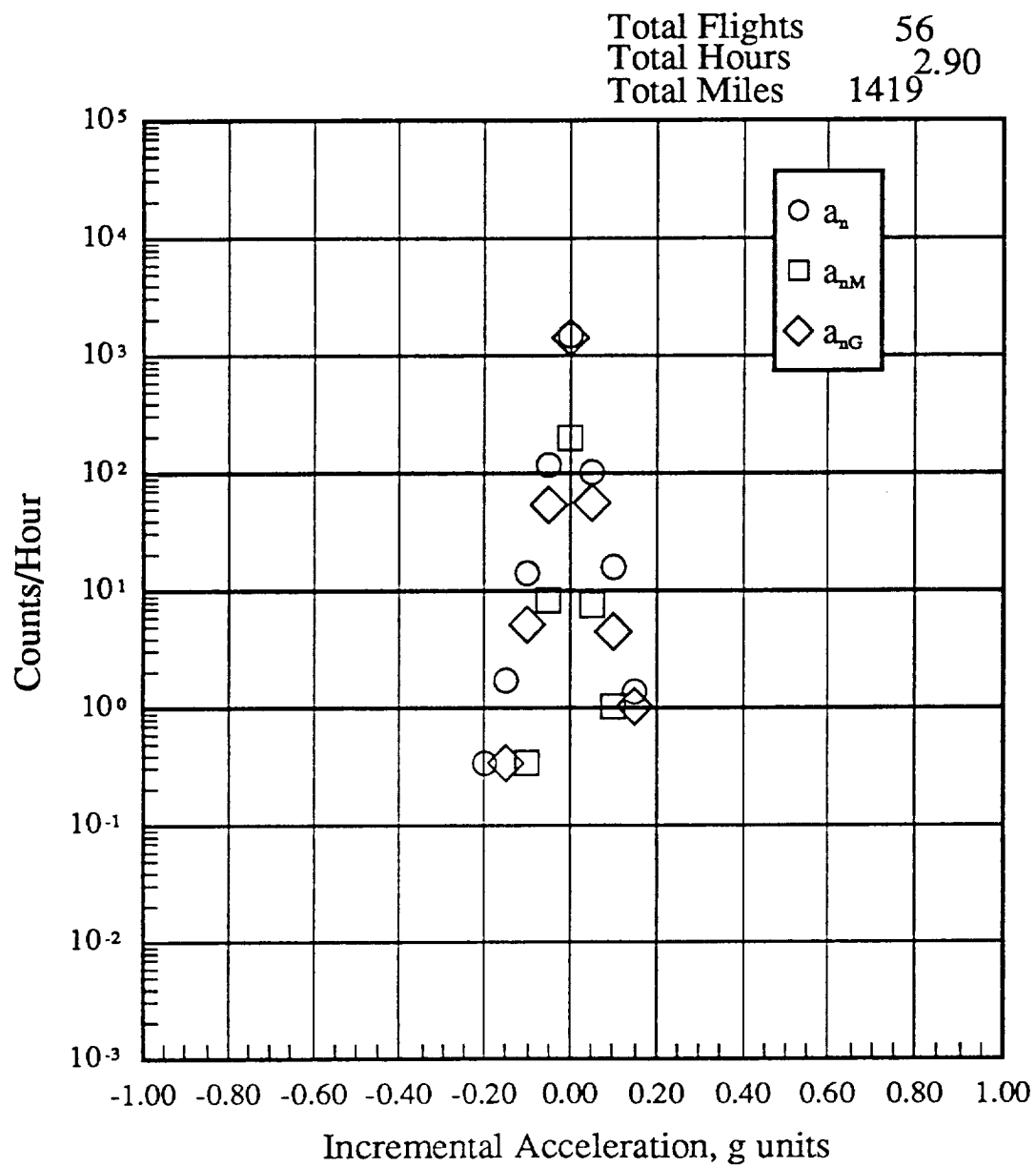
(i)  $a_n$ ,  $a_{nM}$ ,  $a_{nG}$ , 24500 to 29500 feet altitude

Figure 22.- Continued.



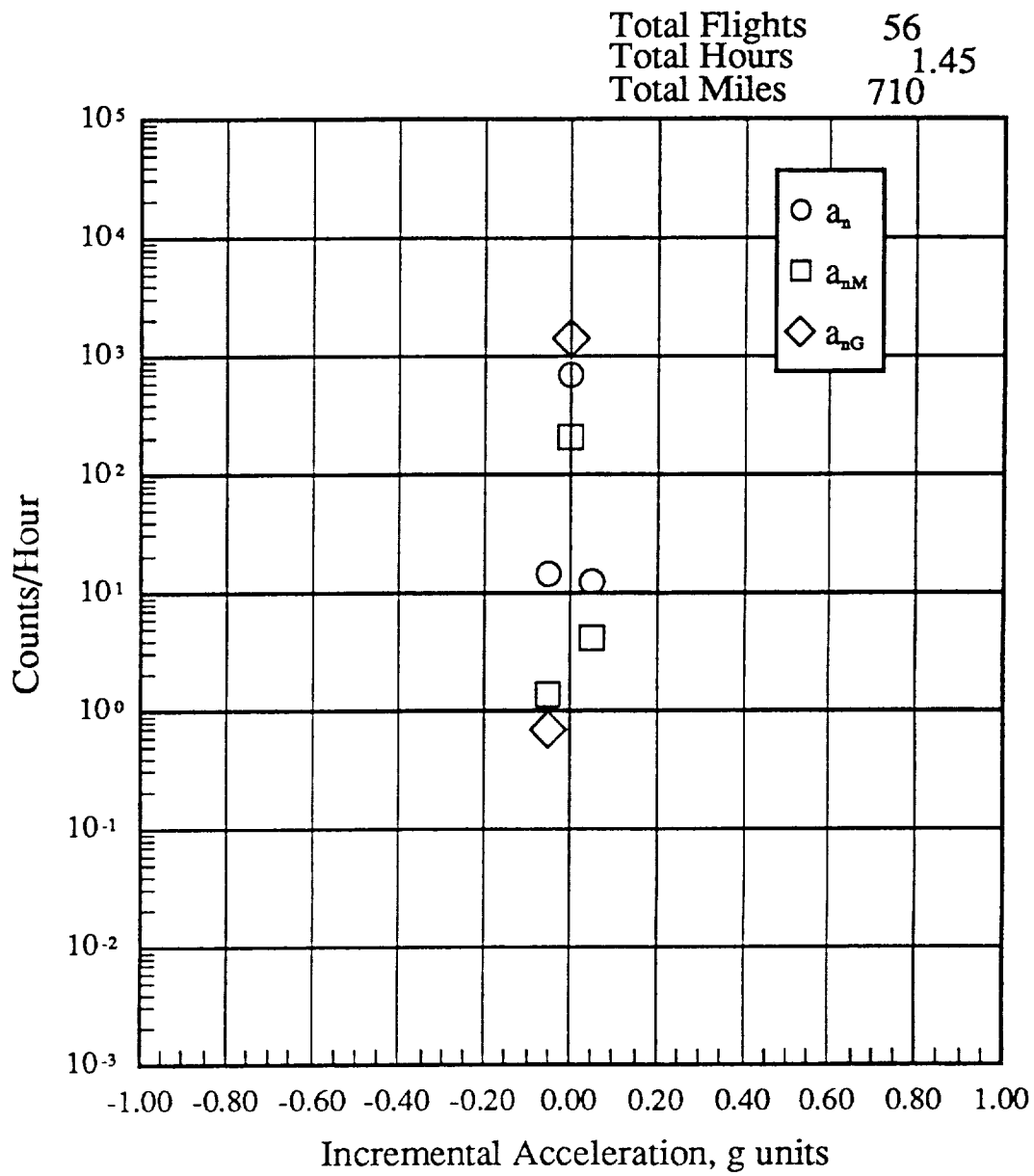
(j)  $a_n$ ,  $a_{nM}$ ,  $a_{nG}$ , 29500 to 34500 feet altitude

Figure 22.- Continued.



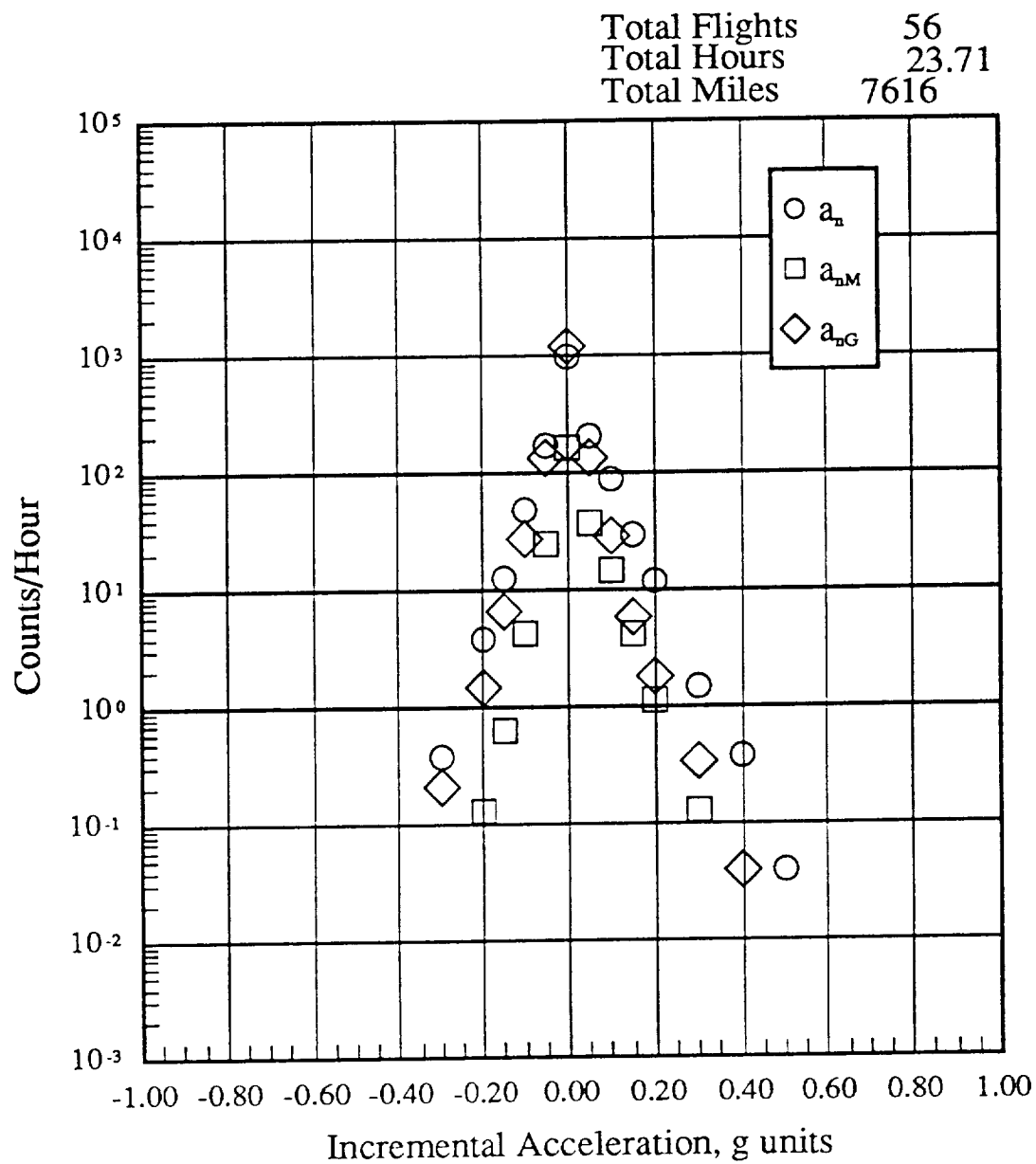
(k)  $a_n$ ,  $a_{nM}$ ,  $a_{nG}$ , 34500 to 39500 feet altitude

Figure 22.- Continued.



(1)  $a_n$ ,  $a_{nM}$ ,  $a_{nG}$ , 39500 to 44500 feet altitude

Figure 22.- Continued.



(m)  $a_n$ ,  $a_{nM}$ ,  $a_{nG}$ , -500 to 44500 feet altitude

Figure 22.- Concluded.

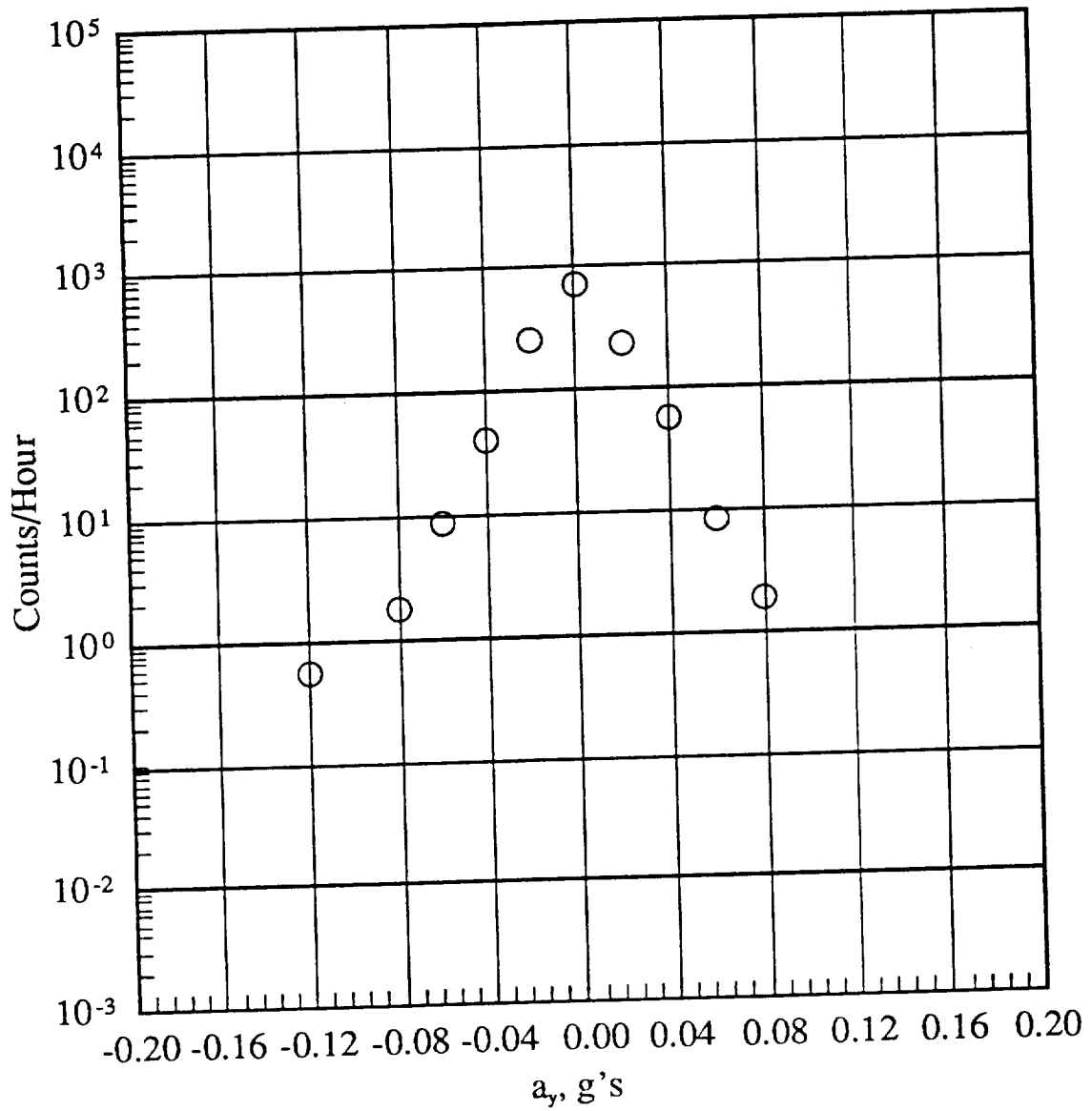
PRESSURE ALTITUDE BAND																					
ay LEVEL g's	-500 TO		4500 TO		9500 TO		14500 TO		19500 TO		24500 TO		29500 TO		34500 TO		39500 TO		-500 TO		
	4500 FT	500 FT	9500 FT	14500 FT	19500 FT	24500 FT	29500 FT	34500 FT	39500 FT	44500 FT	49500 FT	54500 FT	59500 FT	64500 FT	69500 FT	74500 FT	79500 FT	84500 FT	89500 FT	94500 FT	99500 FT
.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.12	0	0	0	0	0	0	1.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.08	1.88	1.10	0.45	3.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.08	0
.06	8.40	2.47	3.13	1.55	1.25	0	0	0	0	0	0	0	0	0	0	0	0	0	1.22	0	0
.04	57.33	13.98	22.32	2.58	16.24	0	0	0	0	0	0	0	0	0	0	0	0	0	4.05	0	0
.02	236.07	82.79	92.87	70.65	156.14	110.22	40.96	3.15	2.76	0	0	0	0	0	0	0	0	0	27.33	0	27.33
0	723.69	710.30	792.04	885.95	783.21	923.00	819.26	40.96	39.64	0	133.50	0	0	0	0	0	0	0	133.50	0	133.50
-.02	260.27	100.61	163.41	47.96	78.70	46.01	39.39	40.67	1419.66	1126.16	864.47	0	0	0	0	0	0	0	864.47	0	864.47
-.04	40.65	18.09	12.95	1.55	6.25	0.96	9.45	2.41	40.67	20.46	144.93	0	0	0	0	0	0	0	144.93	0	144.93
-.06	8.73	2.47	2.68	1.03	0	0	1.58	0	0	4.09	0	0	0	0	0	0	0	0	4.09	0	4.09
-.08	1.77	0.27	0.45	0	0	0	0	0	0	0.76	0	0	0	0	0	0	0	0	0.76	0	0.76
-.12	0.55	0	0	0	0	0	0	0	0	0.21	0	0	0	0	0	0	0	0	0.21	0	0.21
-.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT	9.05	3.65	2.24	1.94	0.80	1.04	0.63	2.90	1.45	23.71	1.45	0.63	309.94	2.90	1.45	0.63	309.94	2.90	1.45	0.63	309.94
FLIGHT MILES @ ALT	1758.01	966.39	794.83	793.19	358.67	505.83	309.94	1419.36	710.03	7616.26	710.03	309.94	1419.36	710.03	7616.26	710.03	1419.36	710.03	7616.26	710.03	7616.26
TOTAL FLIGHTS														56							
TOTAL FLIGHT HOURS FLAPS UP AND DOWN														23.71							
TOTAL FLIGHT MILES FLAPS UP AND DOWN														7616.26							

(a)  $a_y$  Level crossing counts per hour within pressure altitude bands

Figure 23.- Lateral acceleration exceedances: Nonrevenue flights.

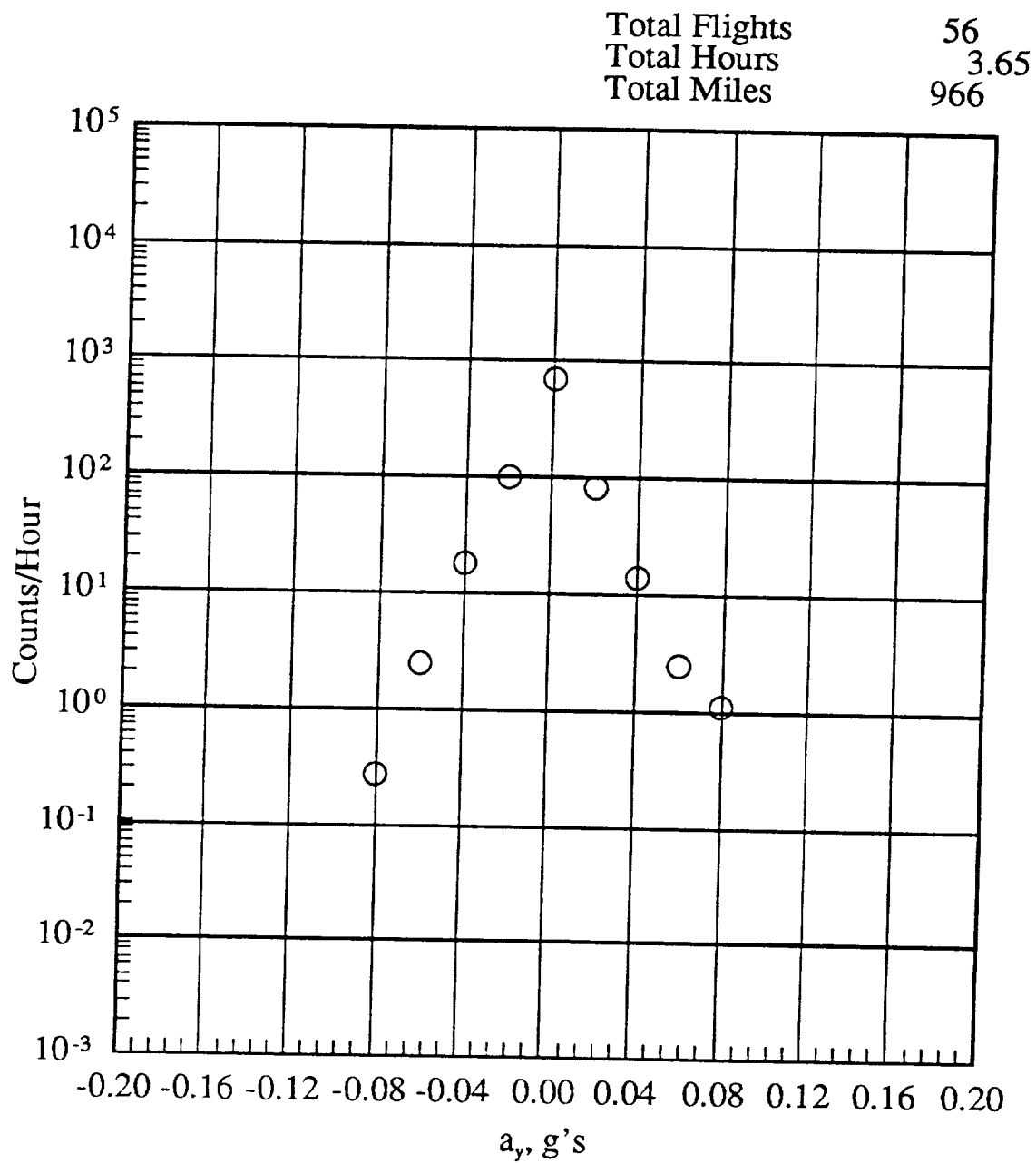
Total Flights  
Total Hours  
Total Miles

56  
9.05  
1758



(b) -500 to 4500 feet altitude

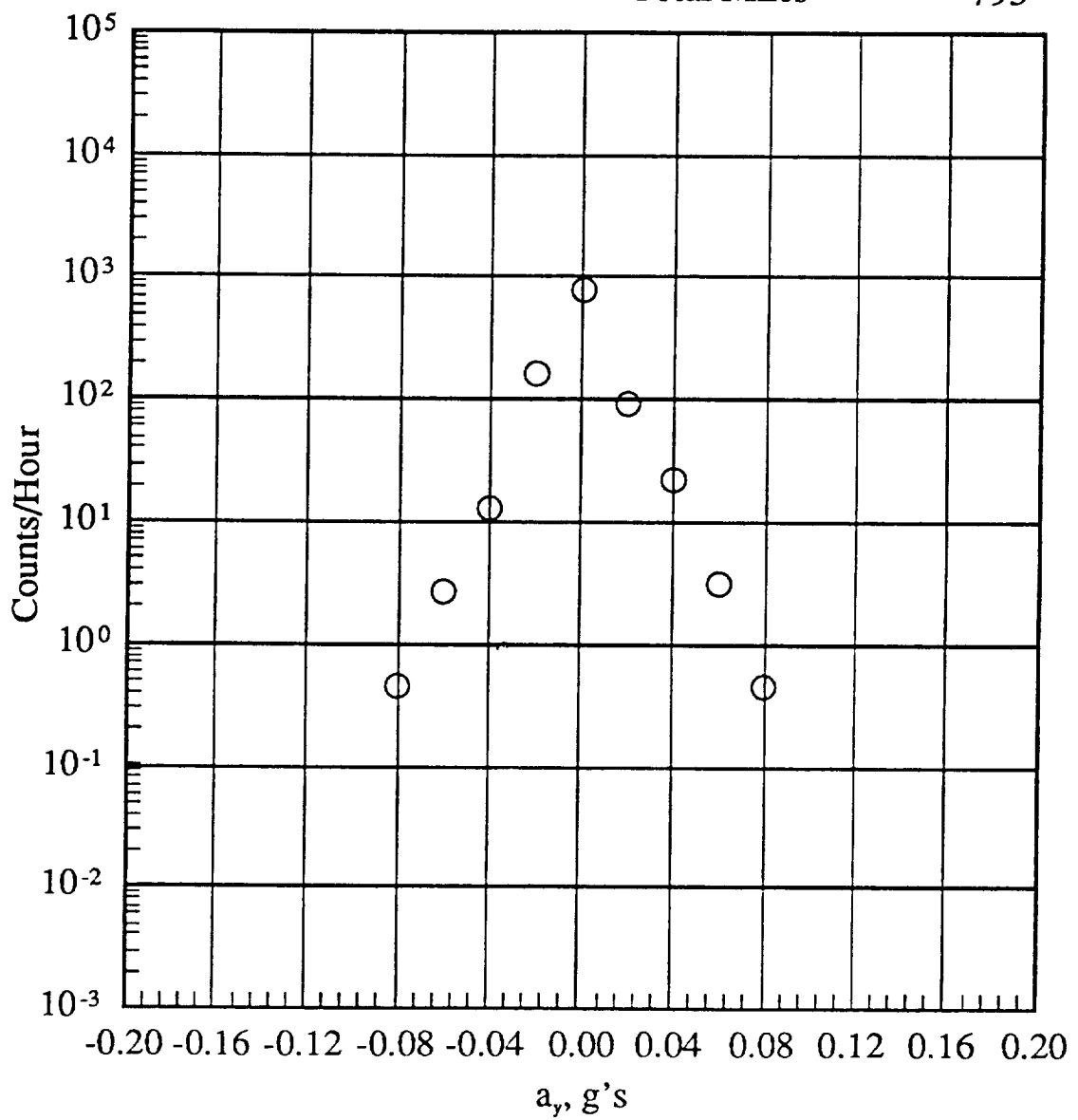
Figure 23.- Continued.



(c) 4500 to 9500 feet altitude

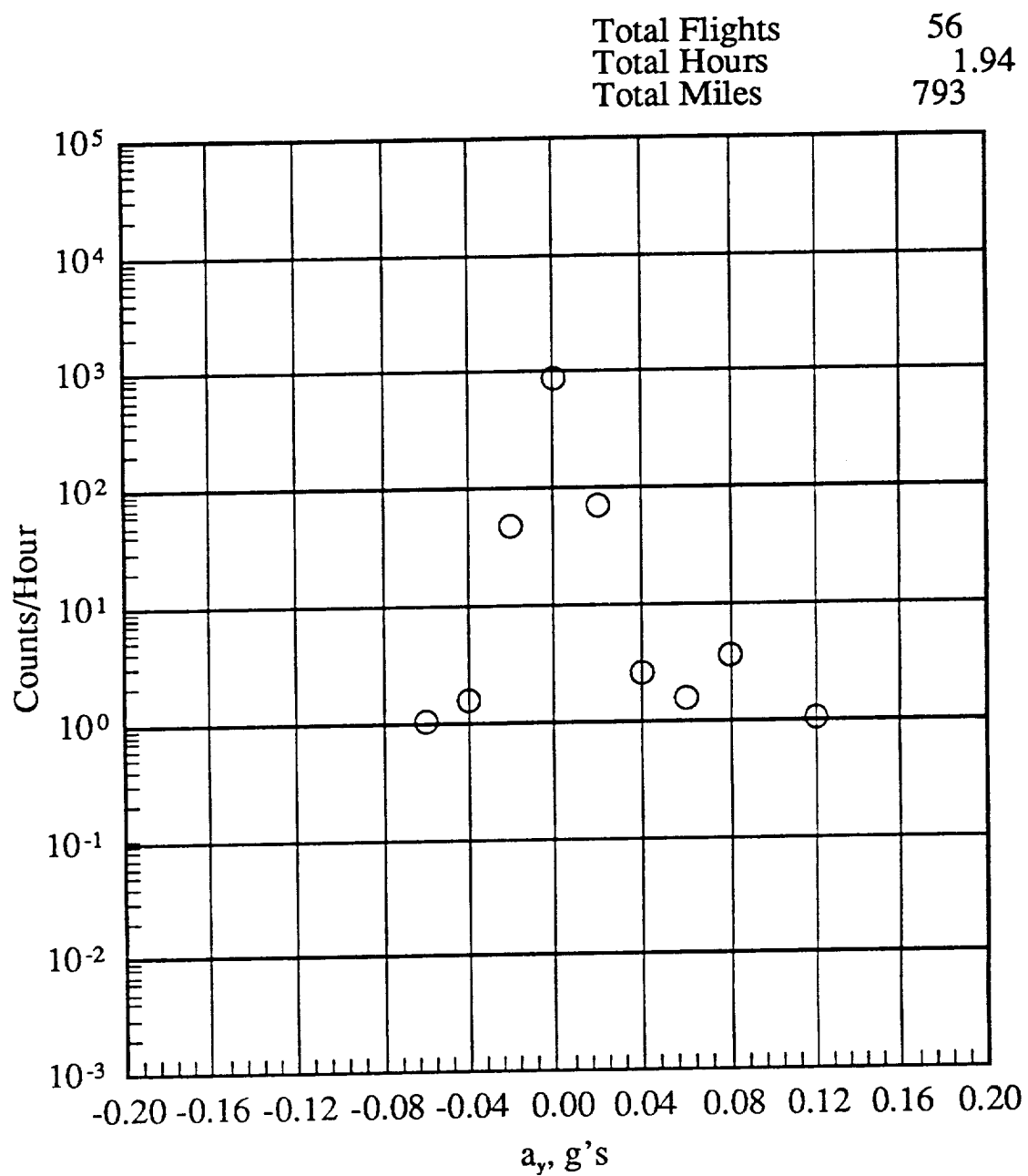
Figure 23.- Continued.

Total Flights	56
Total Hours	2.24
Total Miles	795



(d) 9500 to 14500 altitude

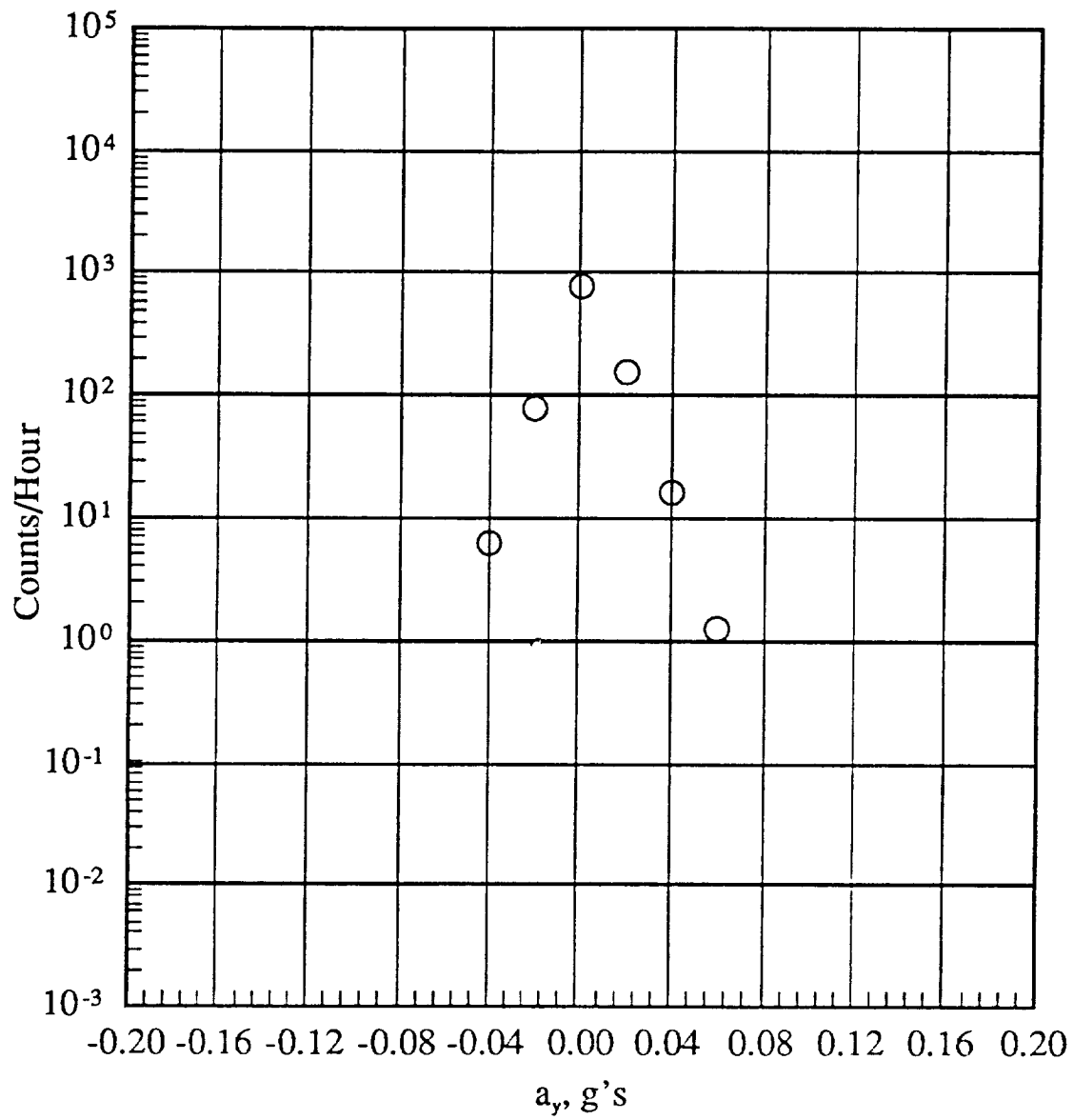
Figure 23.- Continued.



(e) 14500 to 19500 feet altitude

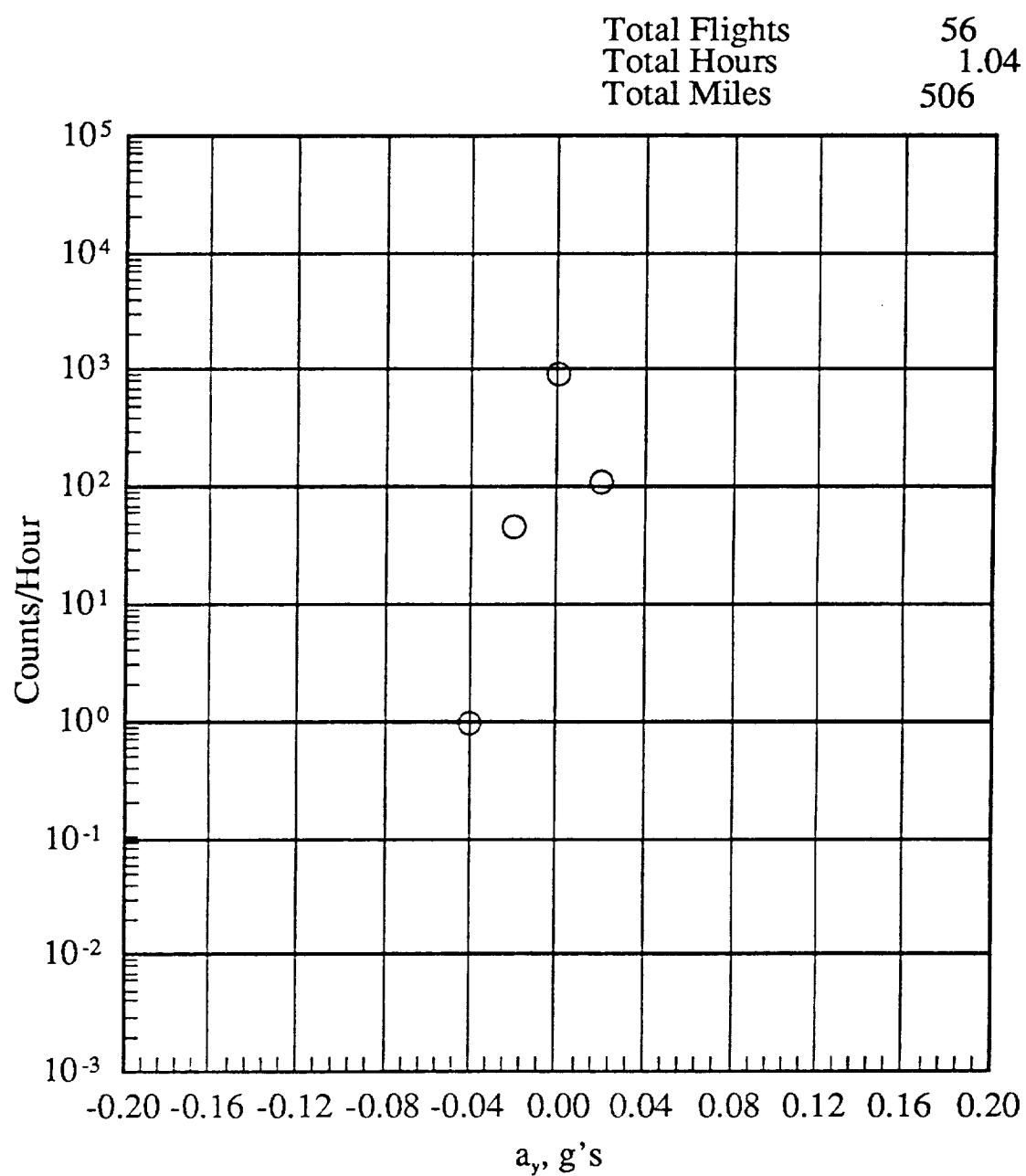
Figure 23.- Continued.

Total Flights	56
Total Hours	.80
Total Miles	359



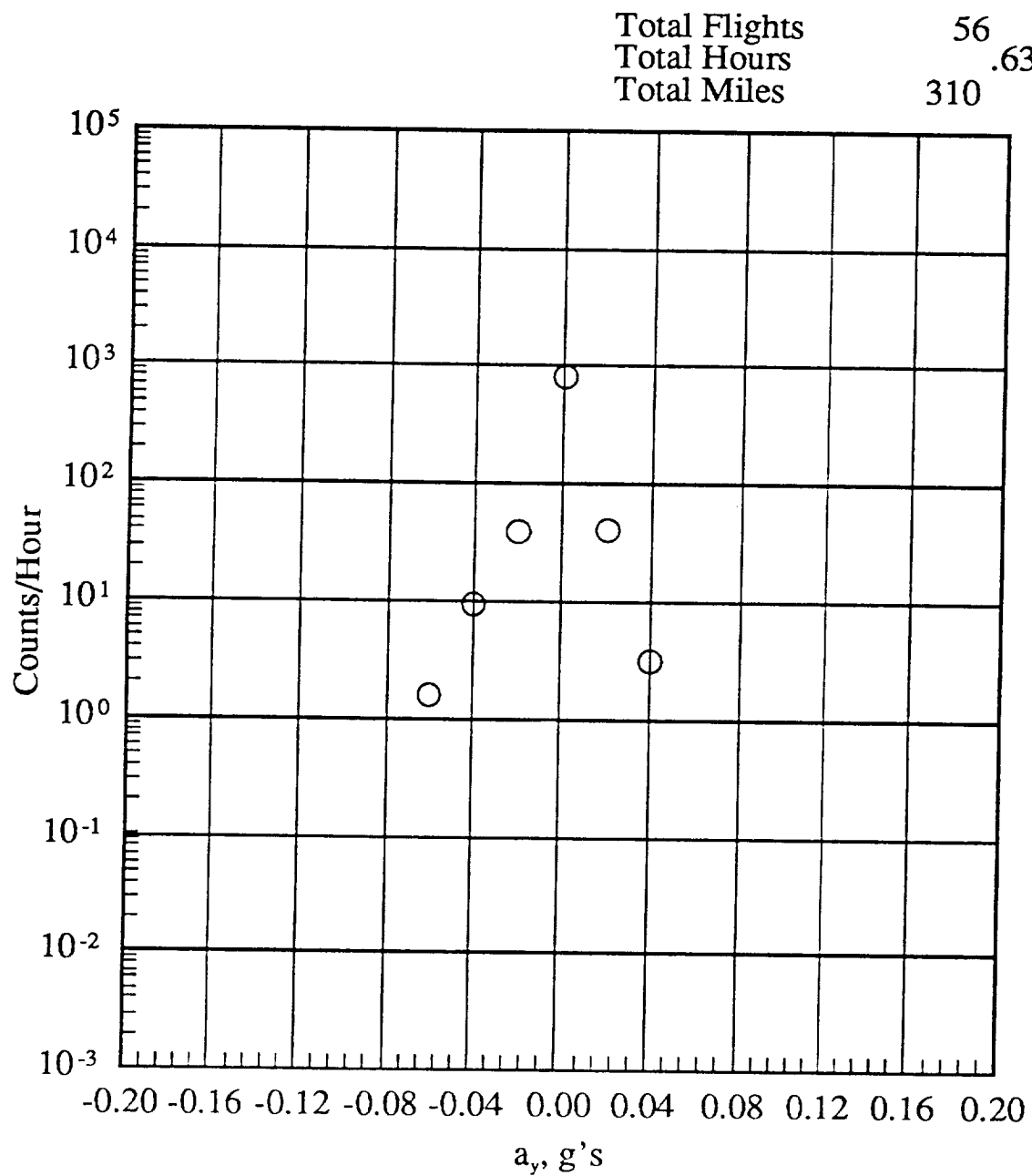
(f) 19500 to 24500 feet altitude

Figure 23.- Continued.



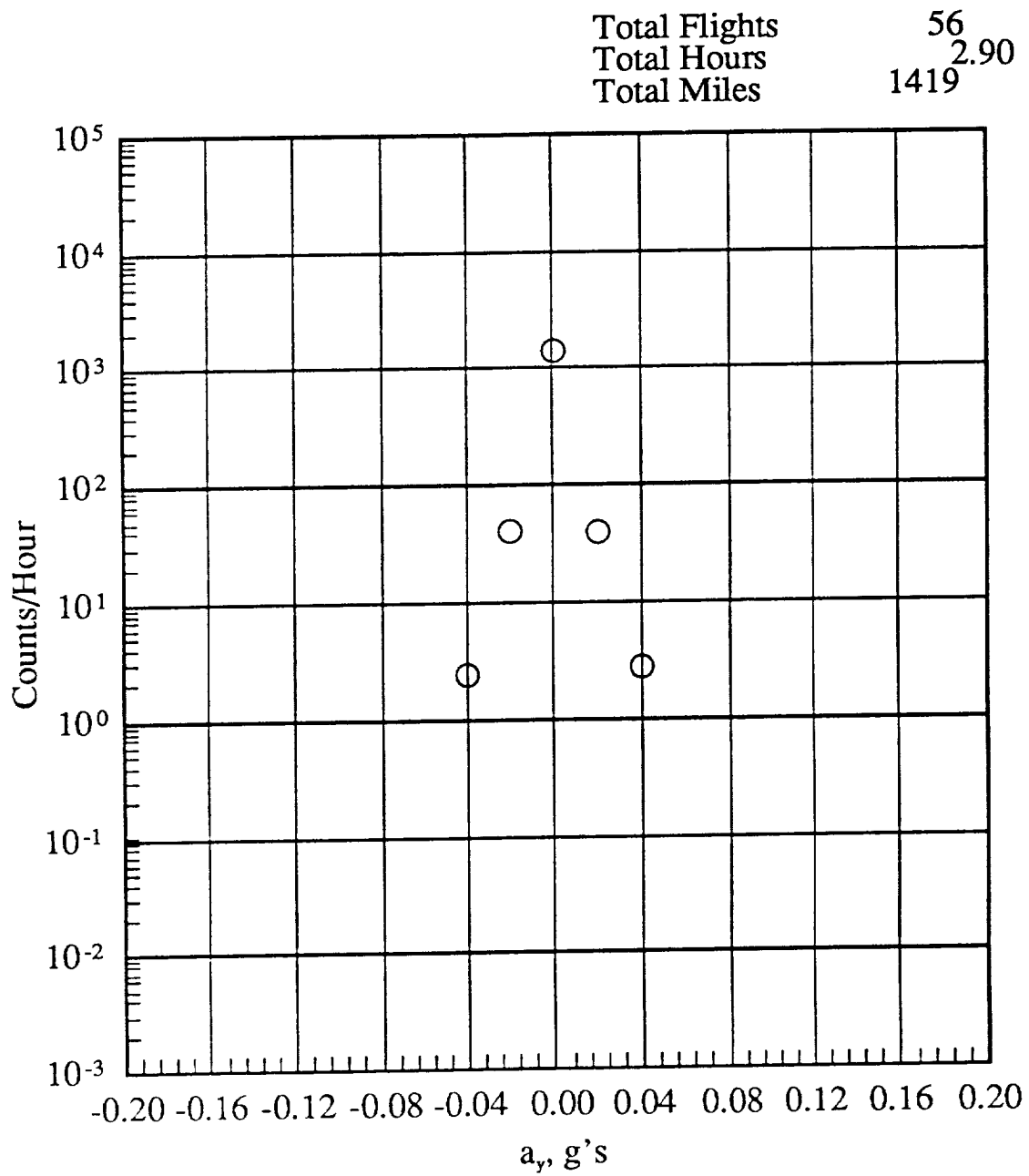
(g) 24500 to 29500 feet altitude

Figure 23.- Continued.



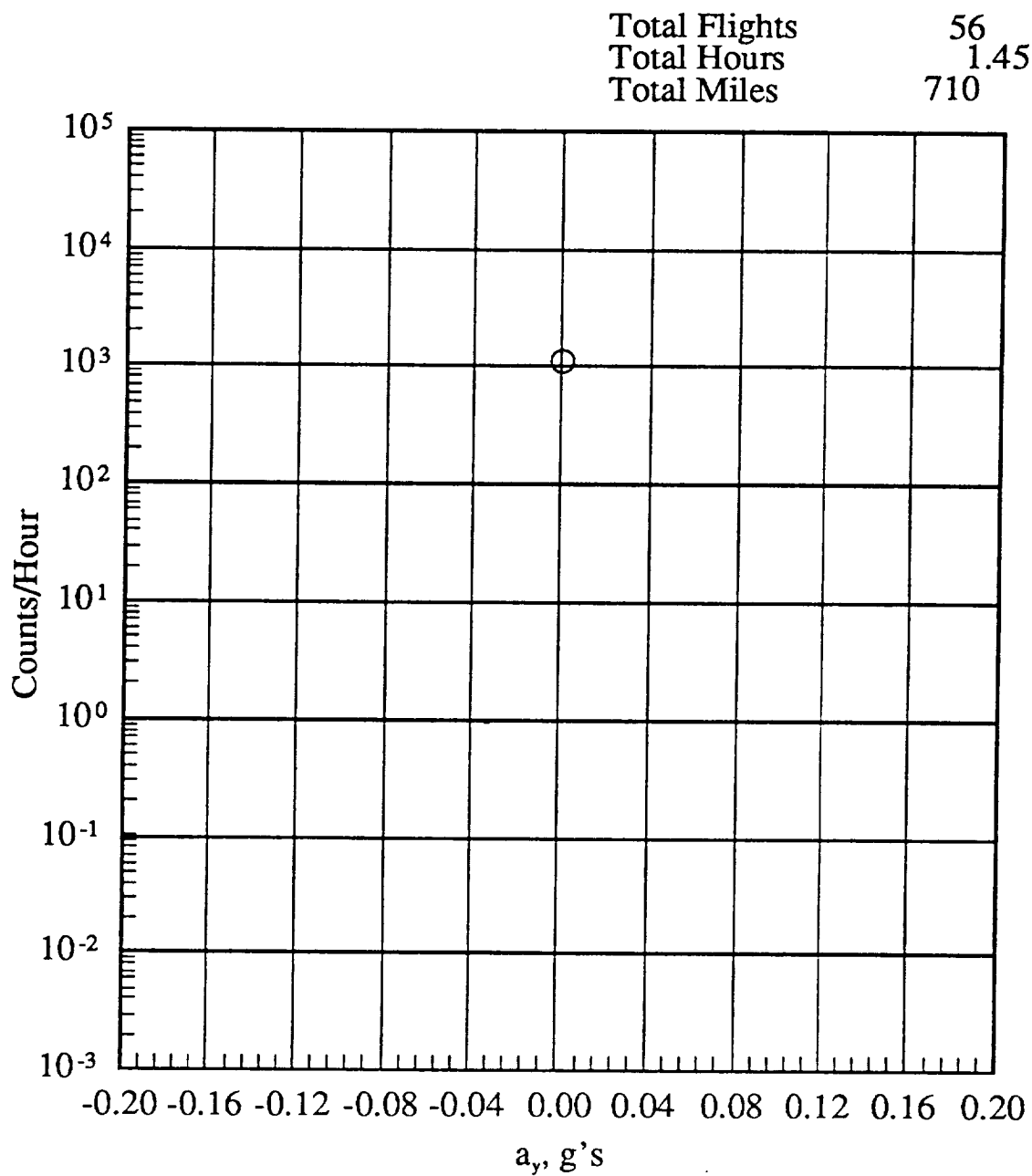
(h) 29500 to 34500 feet altitude

Figure 23.- Continued.



(i) 34500 to 39500 feet altitude

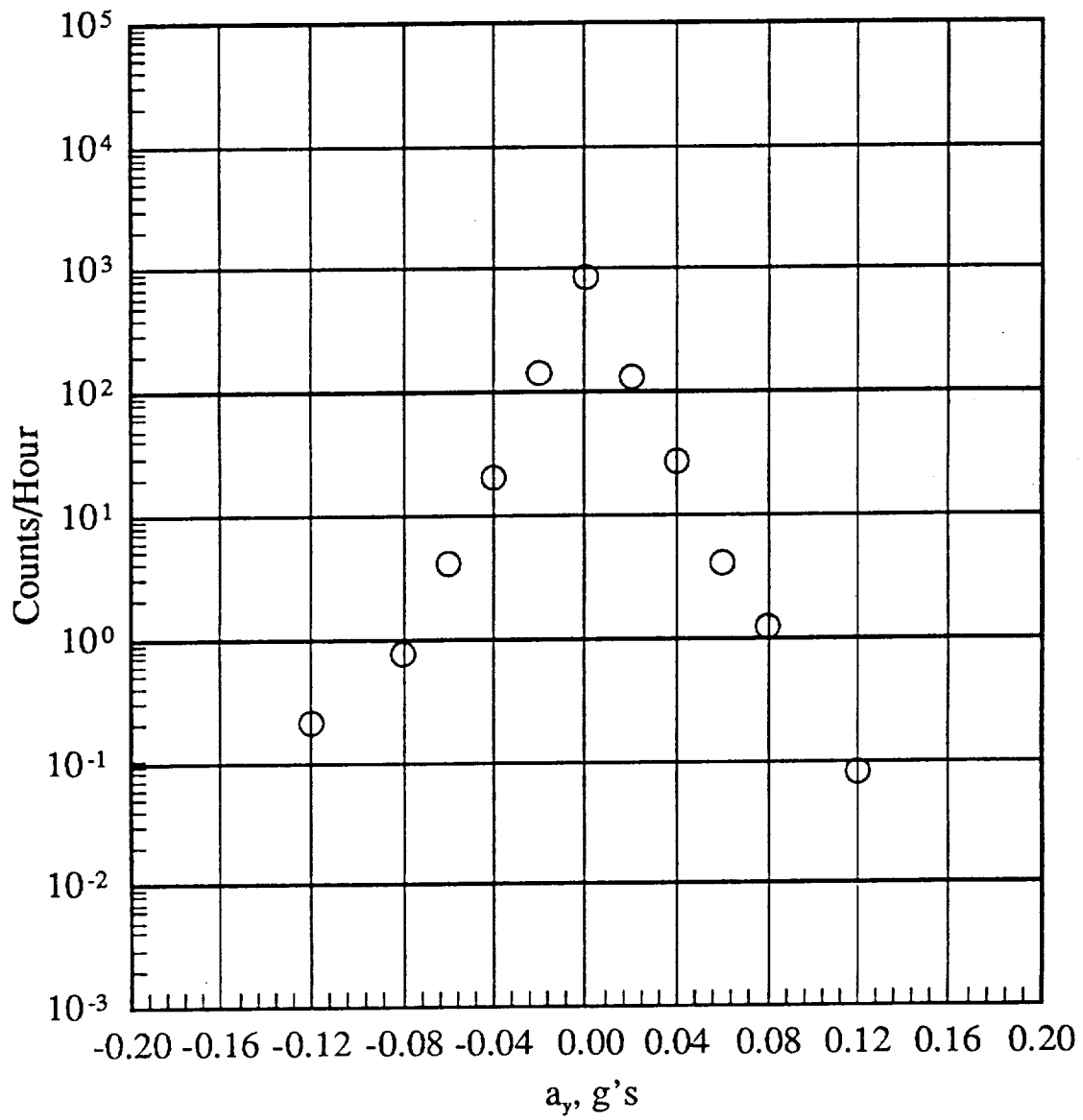
Figure 23.- Continued.



(j) 39500 to 44500 feet altitude

Figure 23.- Continued.

Total Flights	56
Total Hours	23.71
Total Miles	7616



(k) -500 to 44500 feet altitude

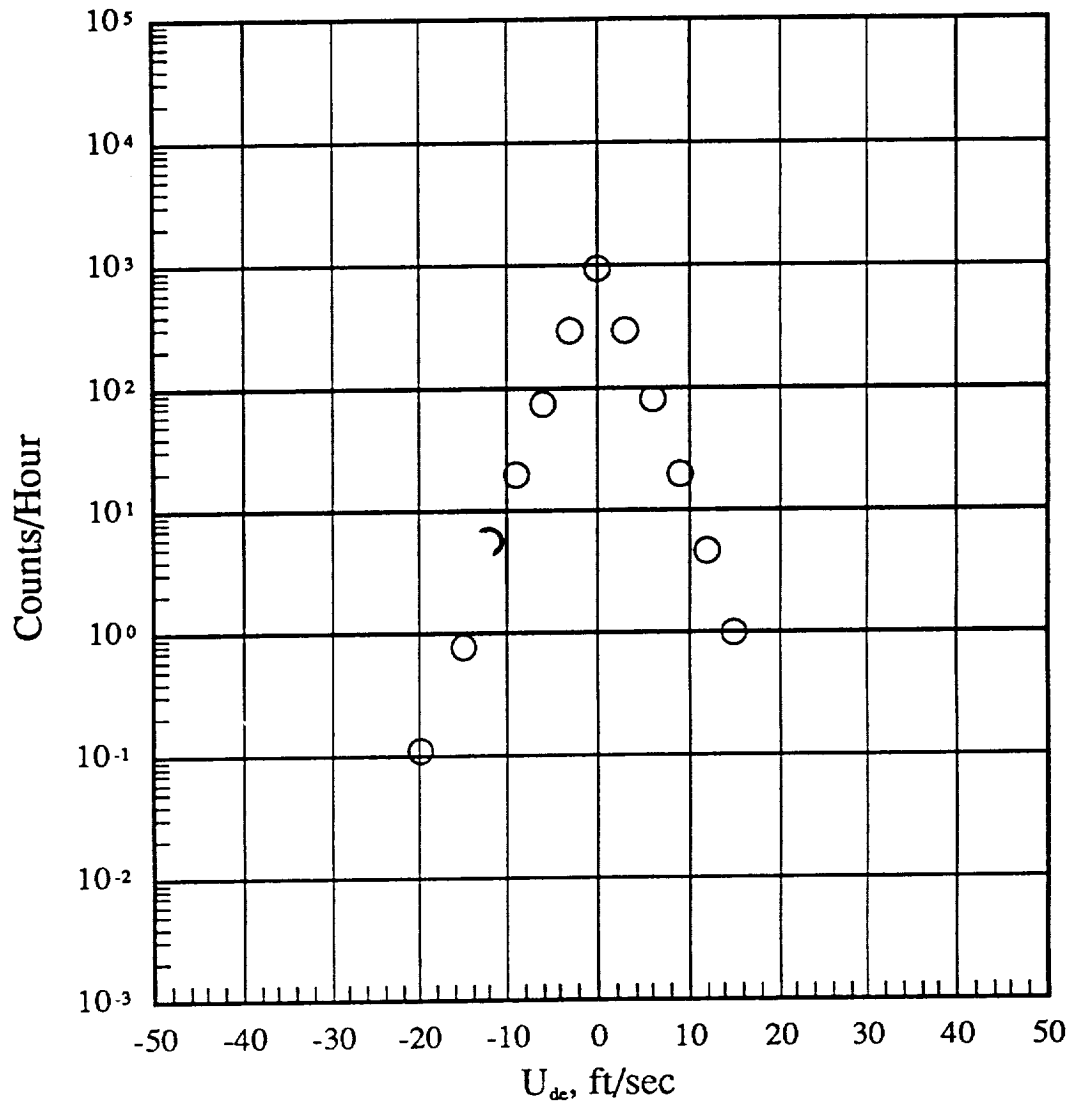
Figure 23.- Concluded

PRESSURE ALTITUDE BAND																				
U <sub>de</sub>	-500 TO		4500 TO		9500 TO		14500 TO		19500 TO		24500 TO		29500 TO		34500 TO		39500 TO		-500 TO	
DERIVED GUST	4500 FT		9500 FT		14500 FT		19500 FT		24500 FT		29500 FT		34500 FT		39500 FT		44500 FT		44500 FT	
VELOCITY LEVEL																				
FT/SEC																				
100	0		0		0		0		0		0		0		0		0		0	
90	0		0		0		0		0		0		0		0		0		0	
80	0		0		0		0		0		0		0		0		0		0	
70	0		0		0		0		0		0		0		0		0		0	
60	0		0		0		0		0		0		0		0		0		0	
50	0		0		0		0		0		0		0		0		0		0	
40	0		0		0		0		0		0		0		0		0		0	
30	0		0		0		0		0		0		0		0		0		0	
20	0		0		0		0		0		0		0		0		0		0	
15	0.99		0		0.89		0		0		0		0		0		0		0	
12	4.64		0.27		0.89		0		0		0		0		0		0		0.46	
9	19.55		3.02		2.68		0.52		0		0		0		0		0		1.90	
6	80.75		7.40		7.59		1.03		0		0		0		0		0		8.23	
3	293.08		41.94		40.63		7.74		12.49		0		3.15		1.03		0		32.98	
0	938.44		1256.66		1288.96		1466.61		1366.55		4.79		15.75		6.55		0		124.68	
-3	292.75		41.40		42.86		4.64		13.74		1478.91		1350.20		1416.56		1419.44		1200.90	
-6	74.35		8.22		10.72		0.52		0		1.92		11.03		6.89		0		124.26	
-9	19.55		1.92		2.23		0.52		0		0		0		0.34		0		30.75	
-12	5.63		0.27		1.34		0		0		0		0		0		0		8.01	
-15	0.77		0		0.45		0		0		0		0		0		0		2.32	
-20	0.11		0		0		0		0		0		0		0		0		0.34	
-30	0		0		0		0		0		0		0		0		0		0.04	
-40	0		0		0		0		0		0		0		0		0		0	
-50	0		0		0		0		0		0		0		0		0		0	
-60	0		0		0		0		0		0		0		0		0		0	
-70	0		0		0		0		0		0		0		0		0		0	
-80	0		0		0		0		0		0		0		0		0		0	
-90	0		0		0		0		0		0		0		0		0		0	
-100	0		0		0		0		0		0		0		0		0		0	
FLIGHT HOURS @ ALT		9.05	3.65	2.24	1.94	0.80	1.04	0.63	2.90	1.45	23.71									
FLIGHT MILES @ ALT		1758.01	966.39	794.83	793.19	358.67	505.83	309.94	1419.36	710.03	7616.26									
													TOTAL FLIGHTS			56				
													TOTAL FLIGHT HOURS FLAPS UP A			23.71				
													TOTAL FLIGHT MILES FLAPS UP AND DOWN			7616.26				

(a)  $U_{de}$  Level crossing counts per hour within pressure altitude bands

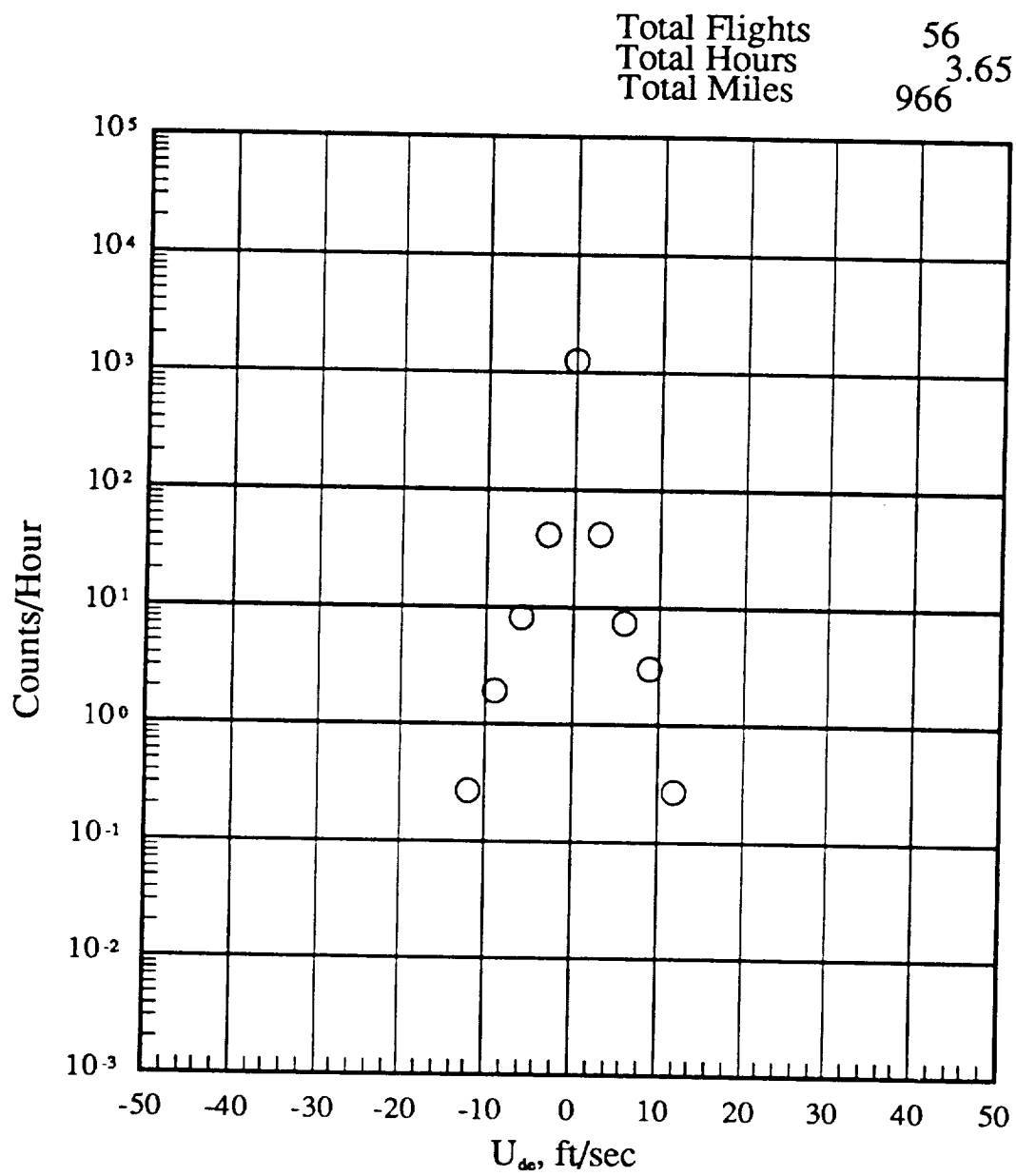
Figure 24.-  $U_{de}$  exceedances: Nonrevenue flights.

Total Flights	56
Total Hours	9.05
Total Miles	1758



(b) -500 to 4500 feet altitude

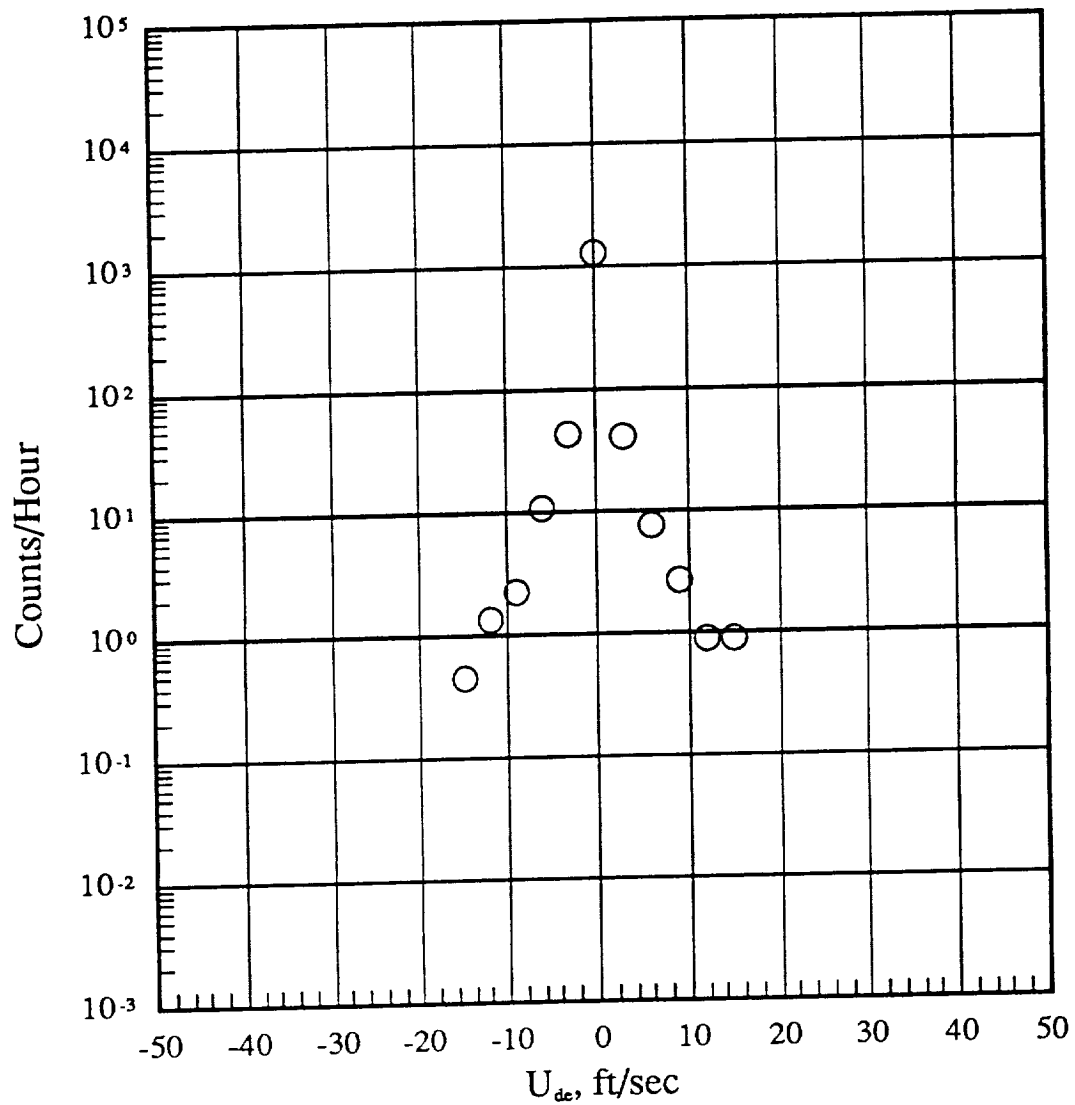
Figure 24.- Continued.



(c) 4500 to 9500 feet altitude

Figure 24.- Continued.

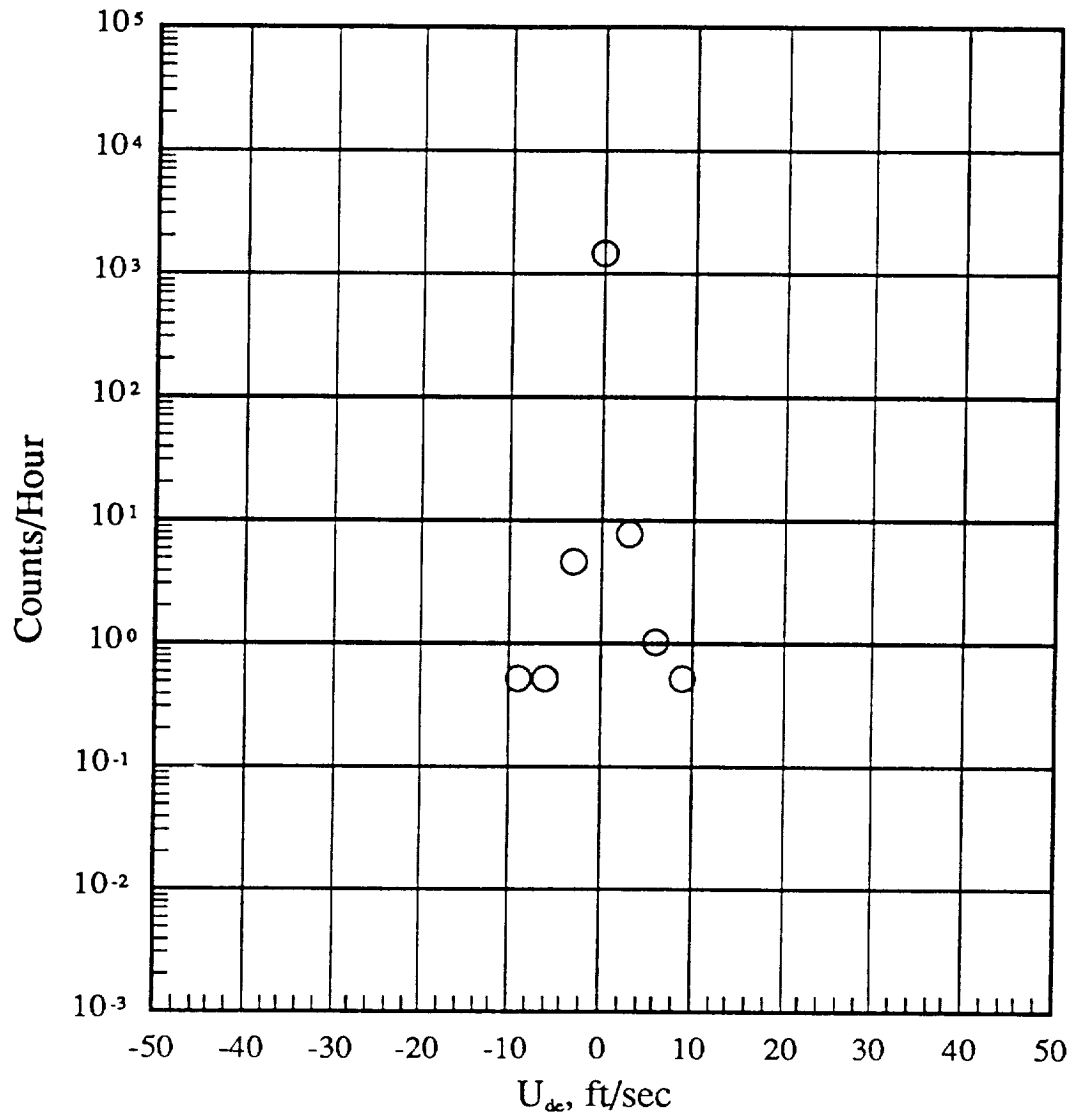
Total Flights	56
Total Hours	2.24
Total Miles	795



(d) 9500 to 14500 feet altitud

Figure 24.- Continued.

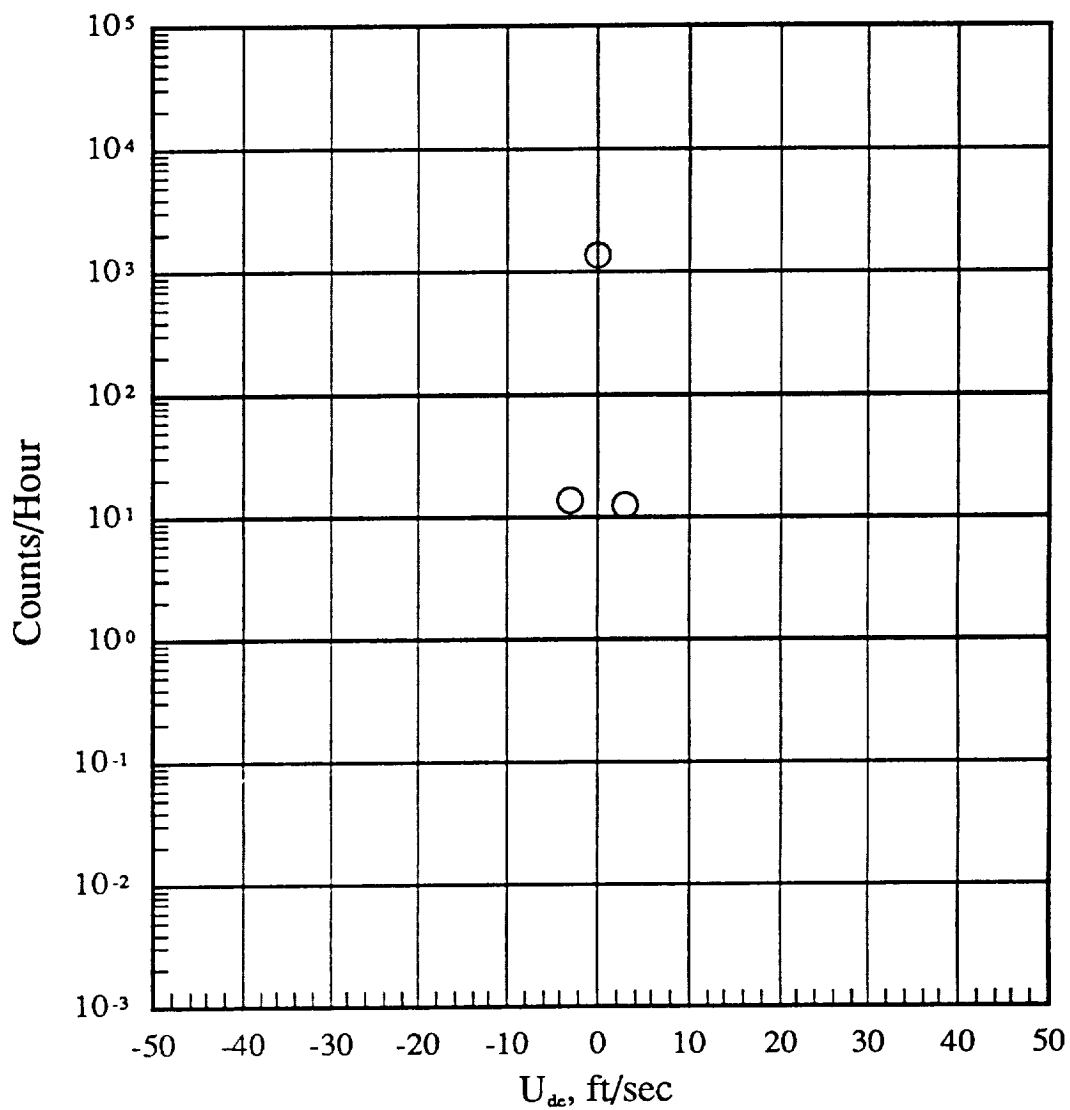
Total Flights	56
Total Hours	1.94
Total Miles	793



(e) 14500 to 19500 feet altitude

Figure 24.- Continued.

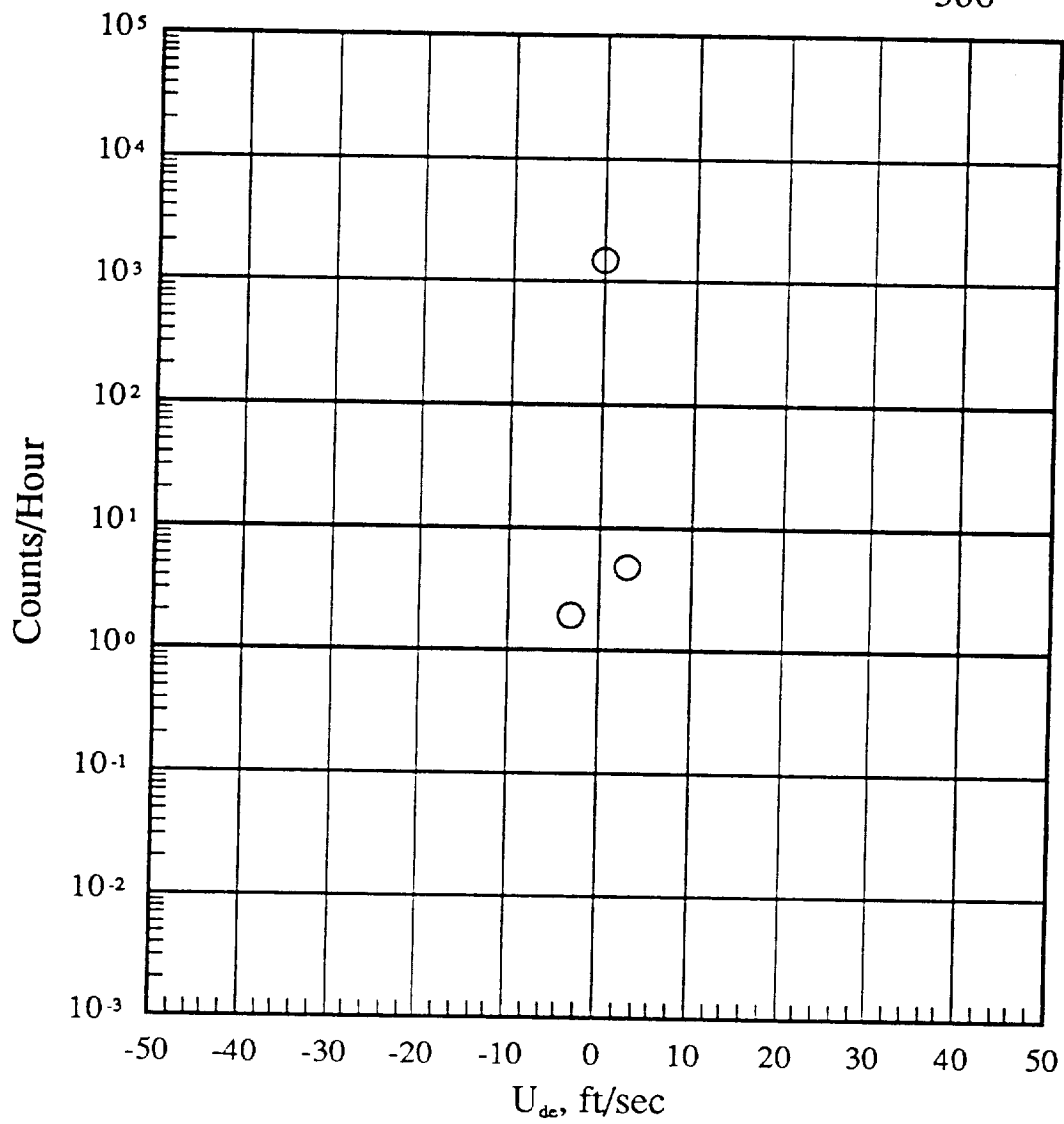
Total Flights	56
Total Hours	.80
Total Miles	359



(f) 19500 to 24500 feet altitude

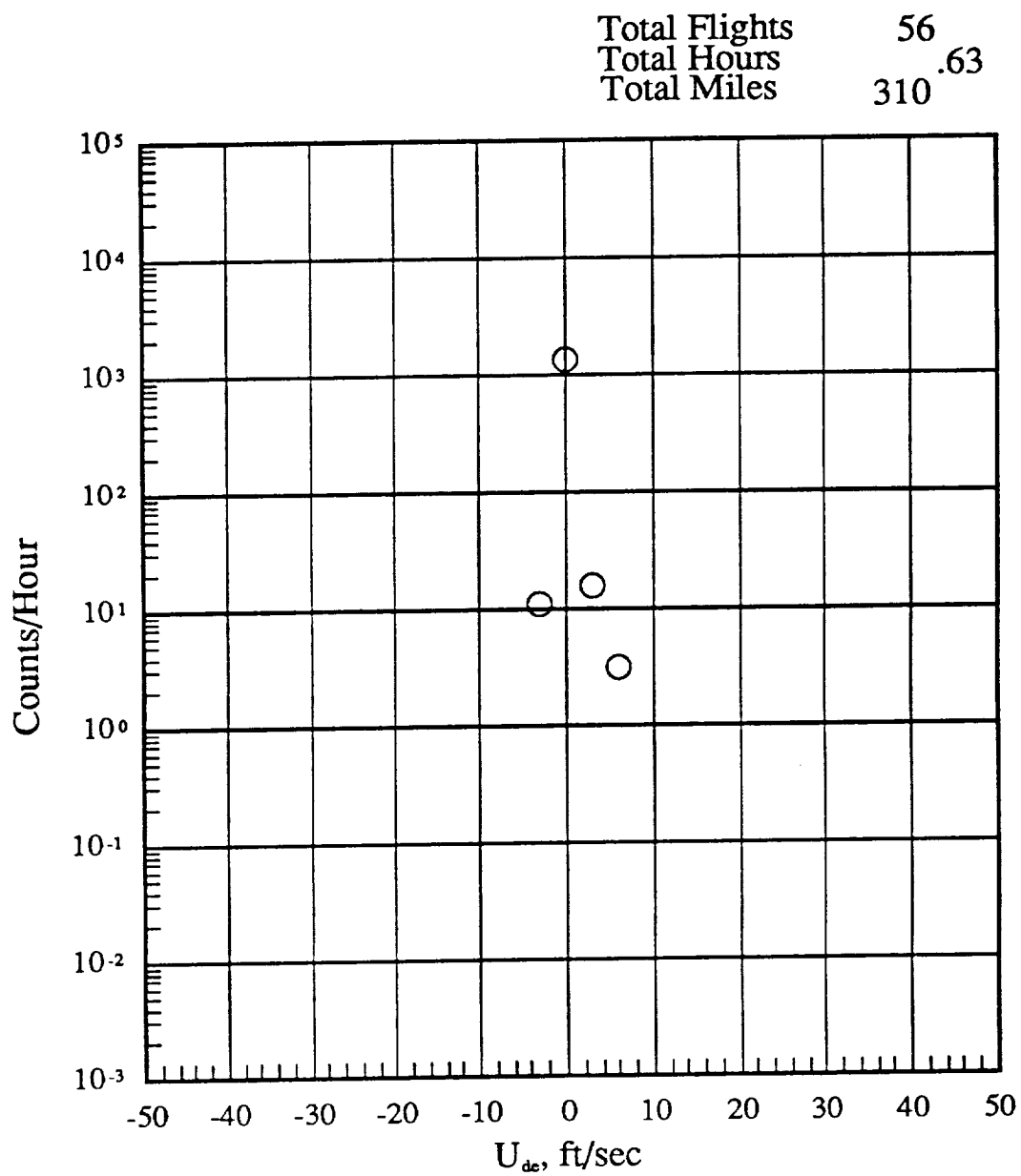
Figure 24.- Continued.

Total Flights	56
Total Hours	1.04
Total Miles	506



(g) 24500 to 29500 feet altitude

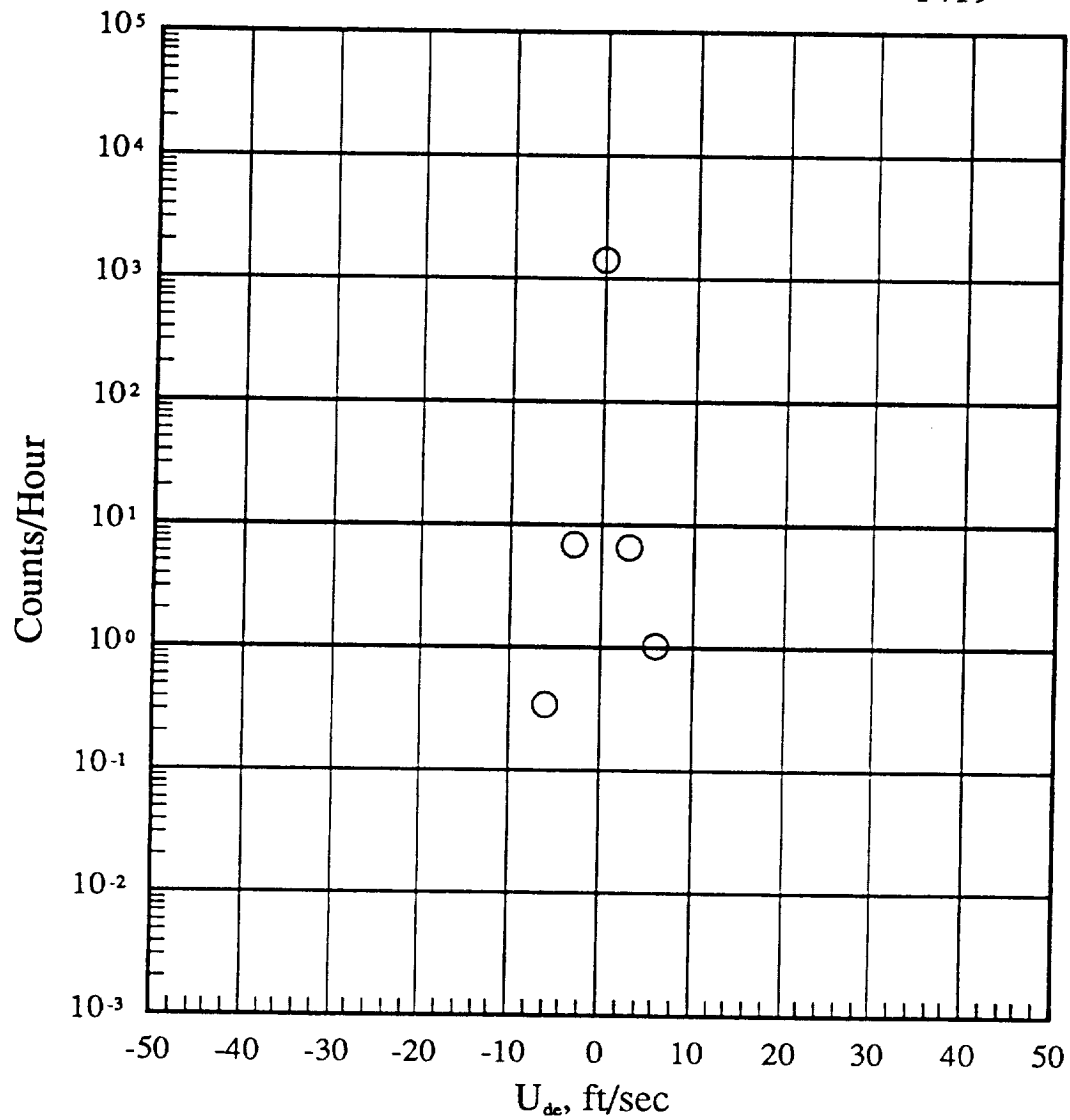
Figure 24.- Continued.



(h) 29500 to 34500 feet altitude

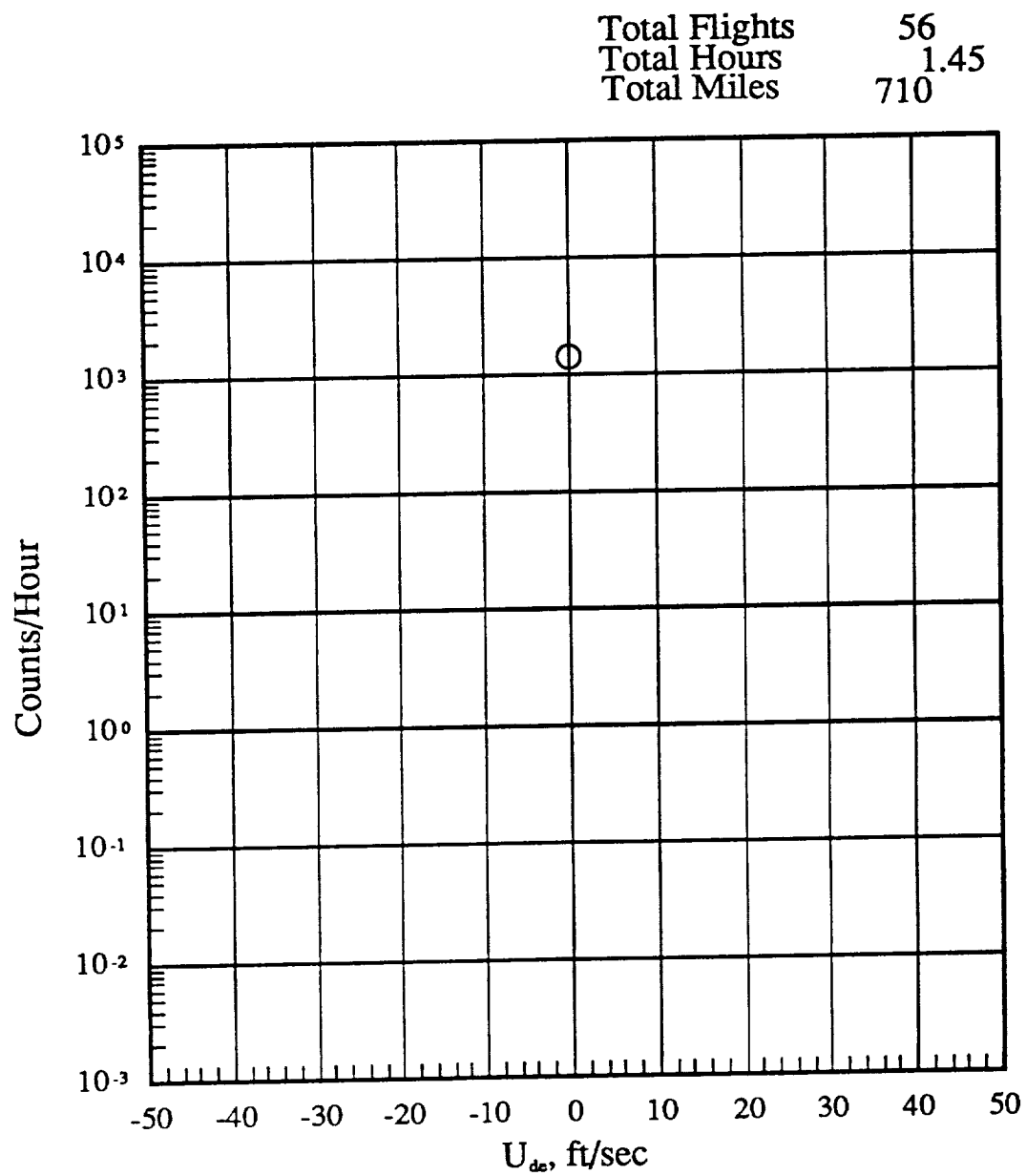
Figure 24.- Continued.

Total Flights 56  
Total Hours 2.90  
Total Miles 1419



(i) 34500 to 39500 feet altitude

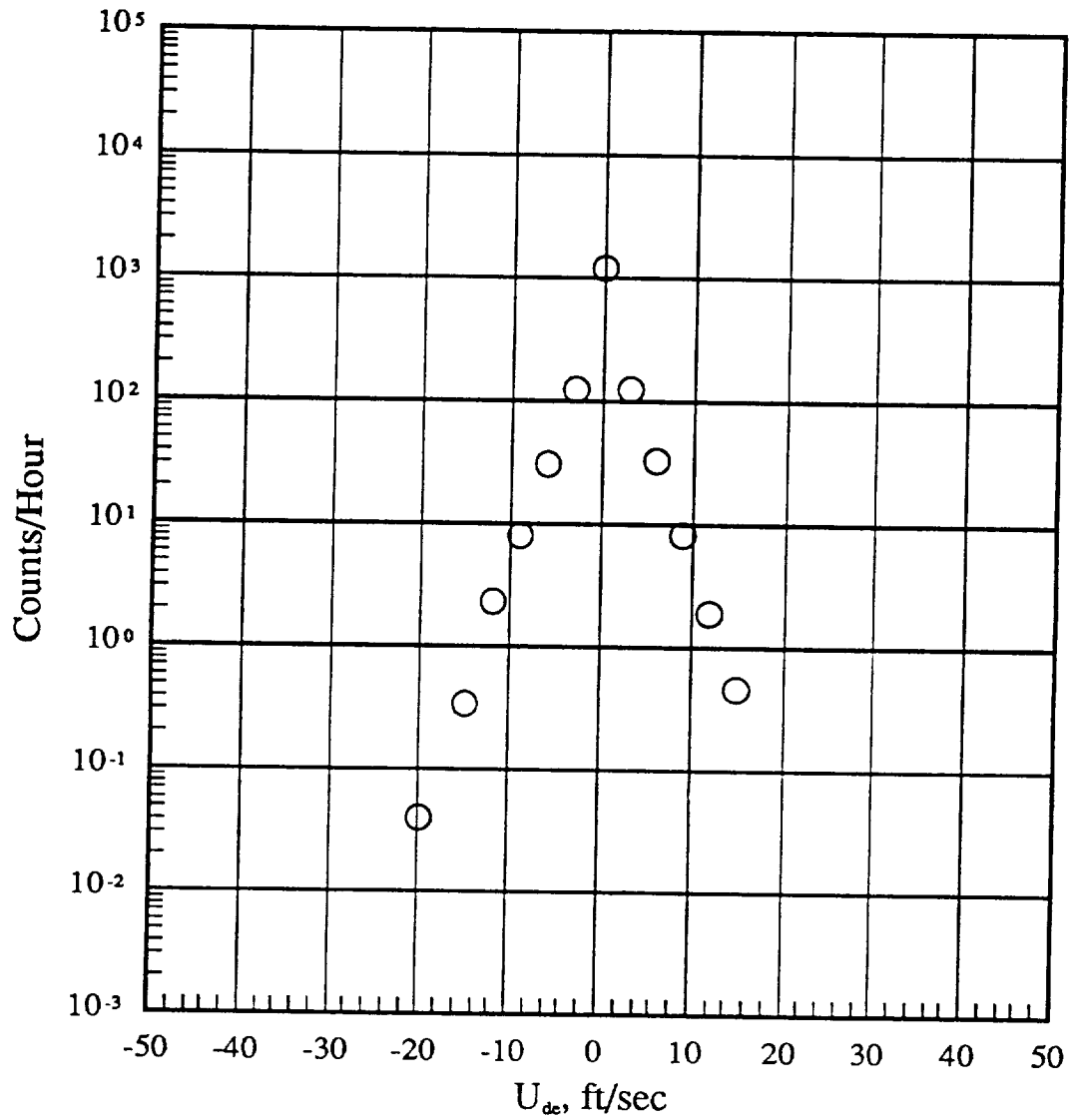
Figure 24.- Continued.



(j) 39500 to 44500 feet altitude

Figure 24.- Continued.

Total Flights	56
Total Hours	23.71
Total Miles	7616

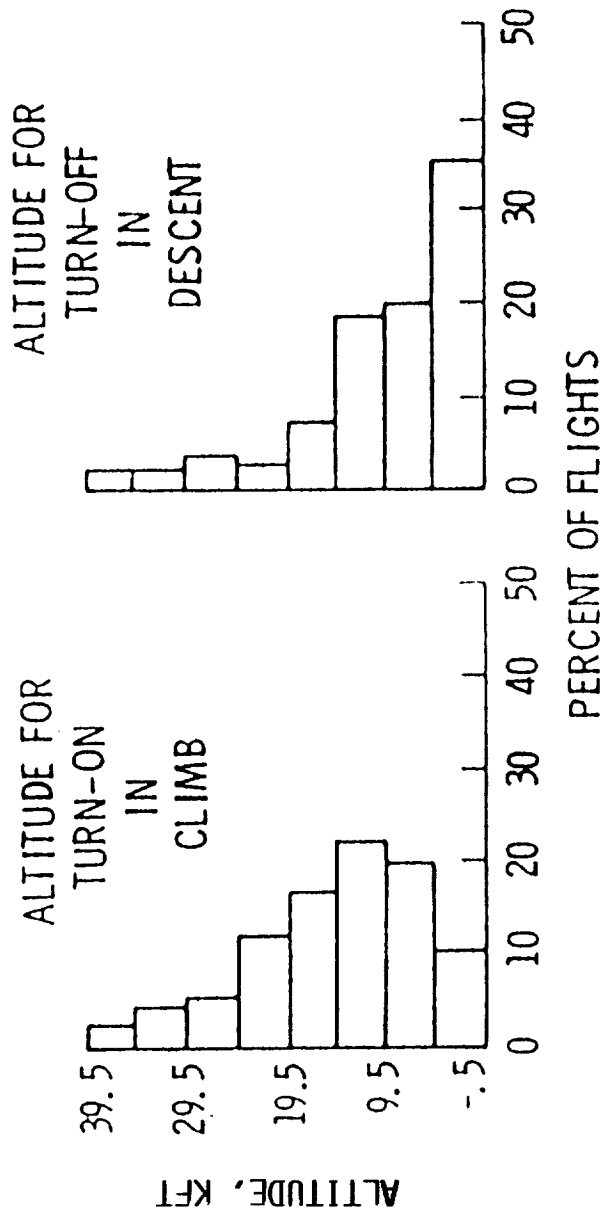


(k) -500 to 44500 feet altitude

Figure 24.- Concluded.

# L-1011 FOR 373 HOURS OF REVENUE FLIGHTS

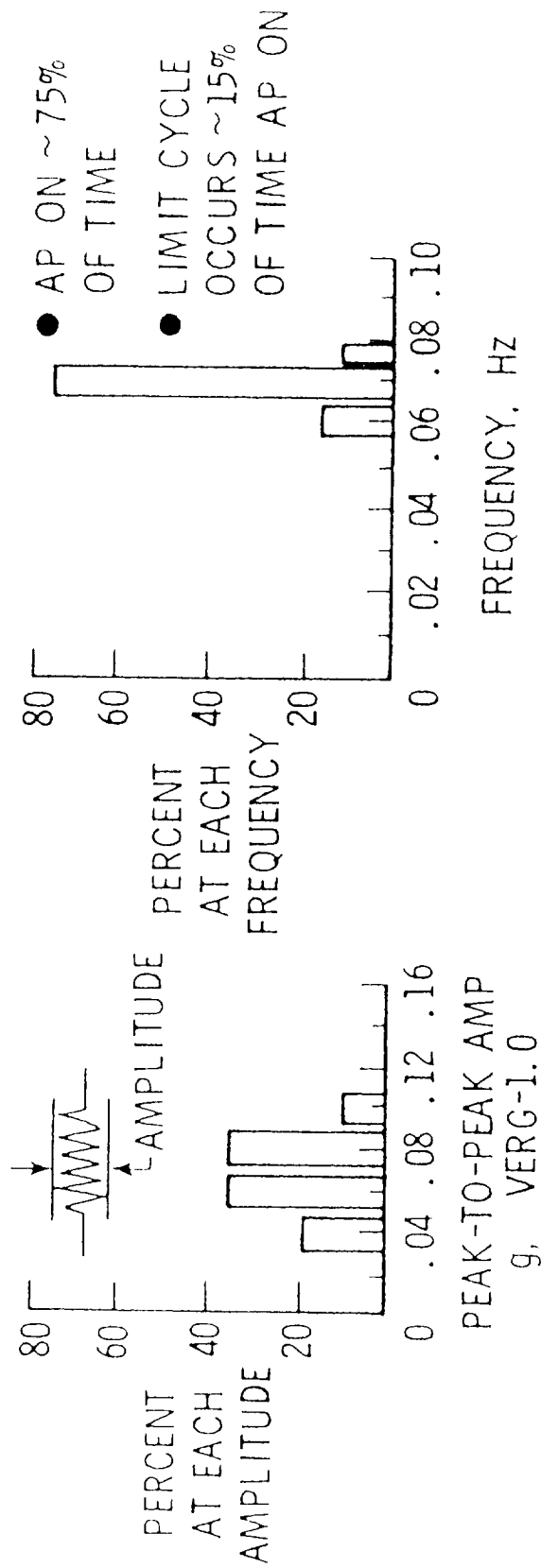
1978



## SUMMARY

- AUTOPILOT WAS "ON" ABOUT 75% OF THE TIME
- AUTOPILOT WAS "ON" AT TOUCHDOWN FOR 5% OF THE FLIGHTS
- AUTOPILOT WAS NOT USED ON 8% OF THE FLIGHTS

Figure 25. - Autopilot on-off statistics.



DATA FROM 373 HOURS L-1011 1978

Figure 26.- Autopilot "limit cycle" experience.

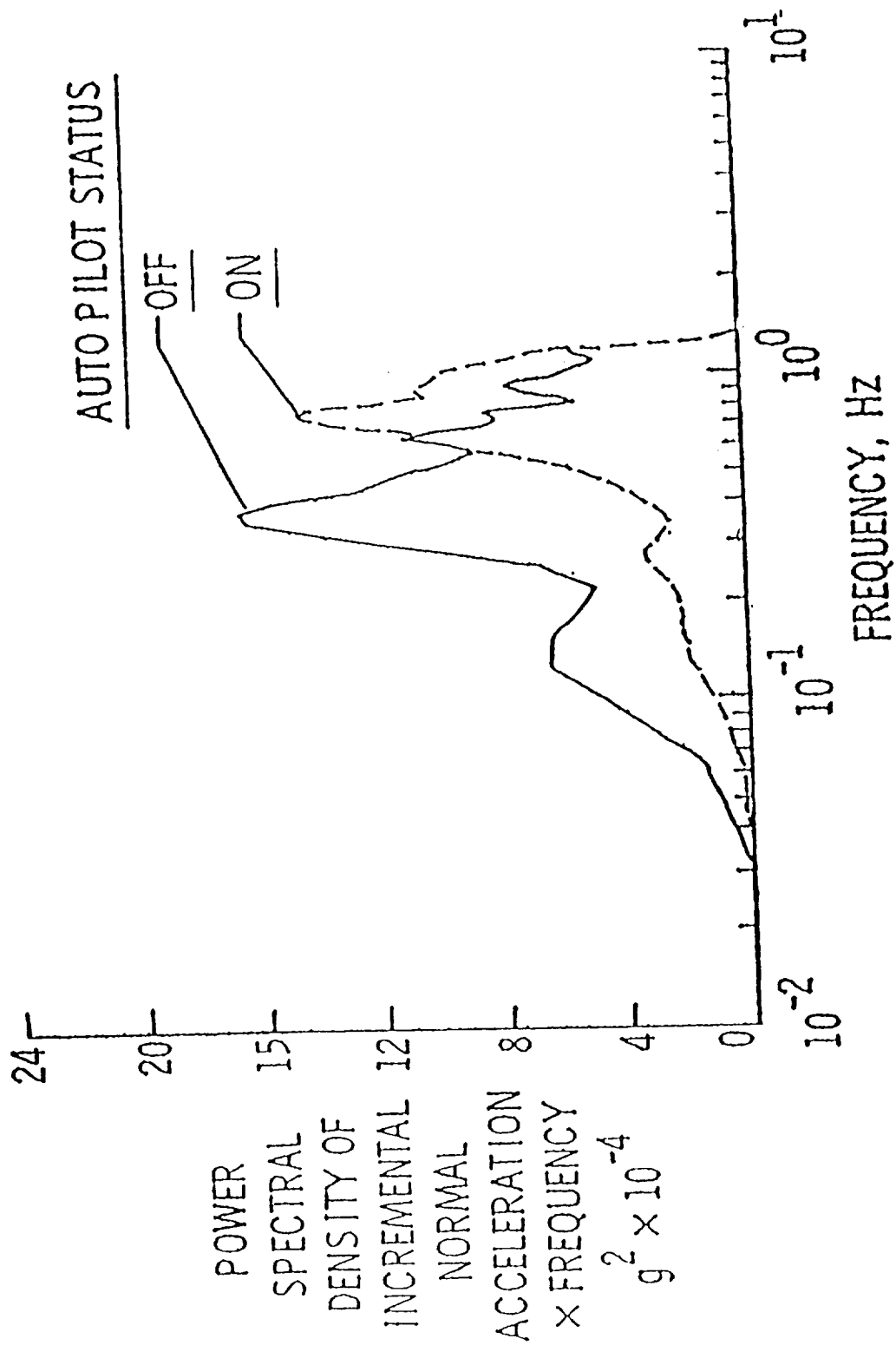


FIGURE 27.- Effect of autopilot on normal acceleration power spectra.



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